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SCIENCE AND CHRISTIANITY

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TRANSLATED FROM THE GERMAN



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Author's Preface



THIS book does not pretend to be a learned work for learned men. I address myself to simple souls thirsting after truth, that I may speak to them of great yet simple truths, which at the present day are too often stifled. I desire to express my profound conviction that the living and personal God of the Bible is the necessary center of a rational universe; that the Creator and his creation in no wise contradict one another; and that all the discoveries of science have been, and ever will be, powerless to prove that his Word deceives mankind. I wish to make clear to my readers how little real science is hidden behind the fine phrases and sounding words of the infidel, and how little he himself understands of the material creation which he affirms to be the only one. Finally, I wish to show them that the Christian and Biblical conception of the universe is more logical, more harmonious, more in accordance with facts, therefore more scientific than all philosophies, all systems, materialistic and atheistic. In conclusion I grant to every one the liberty of opinion, which I claim for myself, only begging my readers to examine and reflect upon my words, drawing such conclusions as they may think right.

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Science and Christianity



CHAPTER I

Progress?

IS there anything which better realizes our idea of stability, of motionless, majestic calm, than this earth on which we live? If we take our stand upon some mountain-peak, from which our eye ranges over a wide prospect of fertile plains, dark forests, and winding rivers, or gaze from some lofty cliff upon the vast expanse of dark-blue ocean, does not this earth, "the nursing-mother of men," as old Homer called it, appear to us firm, steadfast, immovable?

And almost as calm and tranquil is the life of the greater number of its inhabitants. Far from the bustle and the noise of towns, millions, day by day, till the ground plowed by their forefathers, live in houses which they built, and measure the flow of their uneventful existence only by the recurrence of summer and winter, seed-time and harvest.

But in reality, and seen from the eternal heights, calm and motionless, are the last words to be applied to

the earth. This dwelling-place of ours, this globe, with its continents and oceans, is flying, rushing on unceasingly, with its attendant moon, through infinite space, whirling round the mighty sun, which also is ever hastening onward, whither we know not. In the time which the hand of the clock takes to move forward one second, our earth, and we with it, have flown eighteen miles further, never to return to that spot in the universe which we occupied a second ago.

If God, who alone is rest, permitted us to find a fixed point in space from which we could view the earth, what should we see? There would appear in the firmament a tiny star, scarcely visible at first, growing gradually larger and brighter, till it attained the size of the moon. In a few hours it would occupy half, then the whole of the sky. For a few minutes our astonished and confused eyes would catch glimpses of sunny plains and stormy seas, sandy deserts and snowclad mountains, lovely forests and populous cities, alternating in giddy whirl; and the earth would fly past us with a velocity exceeding that of the cannon-ball. Before we had recovered from our amazement and terror, the images would fade, continents and seas become once more mere dark and light spots. Then the whole globe would again be visible, diminishing gradually in size with increasing distance, till it became nothing but a point of light, blown onward into the infinities of space by the breath of God. And it would have been a world we had seen, this mass of matter, with its infinite variety of organisms, its sorrows and its joys, its crime and its sin, carrying on it fifteen hundred millions of immortal souls, made in Jehovah's image.

As the earth is ever hastening through the abysses of space, so hasten the human dwellers on it through the abysses of time, emerging from one silent eternity only to sink into another as mysterious. Where was the human race ten thousand years ago—a second on the dial of the heavens, a day in the sun's year of thirty million earthly years. In that time the star Vega has hardly advanced one half of the moon's diameter in its immeasurable orbit. And where will the human race be when another such second has passed? Short, indeed, is its existence; and every piece of coal which you throw upon your fire is a part of trees which grew on the earth before cherubim or seraphim knew what a man was; for the Elohim had not yet said, "Let us make man in our own image."

From the time when Adam, with astonishment and rapture, opened his eyes on the wonders of Paradise, at most six thousand years ago (for there exists no trace of man which can be proved to be older than that), to the time of Christ, only seventy-four generations succeeded one another. (St. Luke iii, 28-38.) Computing, with Herodotus, a generation at 33.3 years, there have lived, from the time of Christ to the present day (1901) about fifty-seven generations ($1900 = 33.3 \times 57$.) A hundred and thirty-one—or, in round numbers, a hundred and forty men—then, our ancestors, separate you and me from Adam, from our whole genealogical tree. A small assemblage—a moderately large room would hold them all—yet how venerable are these representatives of the human race! At their head stand the nine long-lived giants, who, for fifteen hundred years, from the days of Eden to the Deluge, filled the

earth with violence. Among the rest are nomad chiefs, legislators and founders of cities, poets and sages, also many a beggar and wretched criminal, godless tyrant, honest peasant, industrious artisan, and haughty knight. How interesting it would be to have their autobiographies, comprising a biography of the human race! Patience! Some day, in the wonders of eternity, we shall see them all, and everlasting pictures of their lives and doings; for nothing is lost. The Egyptians of old said, "In the ether are contained the archives of the gods."

And though the human race is, comparatively speaking, few in number, and but of yesterday, yet what an overwhelming mass of thoughts, words, and deeds it has produced! How much men have built and destroyed, planted and rooted up, spoken and written, suffered and enjoyed, sighed, wept, laughed, prayed, and cursed! Thrones and empires have arisen and disappeared, leaving no trace; whole civilizations and races have been born and died. In truth, far more imposing than the rush of the earth through space is the flying, whirling dance of spirits through the history of the world. Men appear upon its stage, speak their few words, and make their exit. Within ten years, the time a boy generally spends at school, Alexander the Great invades Asia with his mailed legions; breaks in pieces the power of the Persians; destroys the proud city of Tyre; builds on a desert Alexandria, to this day a seaport of importance; conquers and bestows kingdoms, changing the face of the earth like a hurricane, and then disappears in the flower of his age; and his empire sets in blood.

And a hundred years ago, in scarcely longer time, an unknown lieutenant of artillery makes his appearance in Corsica; grows in power like a giant; overcomes his enemies in a hundred battles; marches over Europe with one hundred thousand warriors, deposing and setting up kings, creating a new order of things, till one day he also disappears from the scene, to die in solitude at St. Helena. Where are now the kings he made—Louis, Murat, Joseph, Jerome—with their courts and their armies of officials? They have vanished like a dream. Where are the hundreds of thousands who fought at Austerlitz and Leipsic, whom he led to Russia? Where the heavy regiments of cuirassiers whom he saw ride to death at Waterloo in the vain hope of saving his tottering power? He and they are now shades in Sheol. All that remains of them on earth, a handful of dust! And most of us saw, but a quarter of a century ago, a mighty German Empire arise, through blood and iron; and how many of those who risked their lives to give it birth have already gone down into the grave! A few years more, and not one will be alive to tell the tale. According to the old Scandinavian mythology, withered leaves are falling continually from Ygdrasil—the world-ash—while thousands are bursting into bud. From the rising of the sun to his going down, each new day sees thousands of human souls pass out of this life, to be carried by angels into Abraham's bosom, or to become the prey of Satan, their master while on earth; and each day thousands of child-souls enter, weeping, upon a new state of existence.

Looking thus at the life of each individual, as well

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as that of the race, we cry, with Bildad, "For we are but of yesterday, and know nothing, because our days upon earth are as a shadow." (Job. viii, 9.)

One is overcome with astonishment at the presumption of this creature—man—here to-day, and gone to-morrow, who has not had time for a proper examination of the earth he lives on, nor the beings around him; who knows next to nothing of the myriads of other worlds and the universe in general, to say nothing of heaven and hell; yet boldly, and in the name of Science, makes such statements as: Matter is eternal; The forces of nature are eternal; Observation teaches from all time; Such a thing as a miracle has never taken place; It is an utter impossibility that the laws of nature should ever vary; Never has there been a revelation of the Supreme Being.

It is as if ephemera, many kinds of which live only an hour or two, were to assemble on the broad leaf of a water-lily to listen with attention and admiration to an orator who proves to their satisfaction that there never was a time when this immense expanse of water—their pond—was dry; nor when the vegetation surrounding them was lifeless and withered. Still less had this present dwelling-place of theirs ever been covered by a hard, transparent mass, as a superstition declared, explaining the fact by calling it solid water. (Loud laughter.)

How must this display of human wisdom appear to the sons of God, who "shouted for joy" at the creation of the world (Job. xxxviii, 7); to the "watchers" and "holy ones" whom Daniel saw (Dan. iv, 17; x, 5, 6); to the cherubim and seraphim, who look into

the past and the future, and to whom the highest analysis of a Newton, the deepest thoughts of a Plato, are but the babble of an infant!

The earth, we know, is hastening ever onward through space. Whither tends this everlasting journey? Whoever has lived fifty years on earth is many millions of miles distant from that spot in the universe where he first saw the light. This journey must have, in common with all that exists, a purpose and a destination, though they are hidden from us. Is Phœbus, our sun, with his planets, which, one by one, shall fall into him, moving ever downwards in gigantic spirals to the abysmal depths where, as in Dante's lowest hell, is eternal ice? Or is he wandering aimlessly and endlessly onward through infinite space? Or is he circling upwards to empyrean heights, where reigns a fuller life and forces unknown and terrible? We do not know.

Hidden from us, too, are the destinies of humanity. We know from God's Word that in the beginning he created heaven and earth, and that in the end he will be all in all. We do not know in accordance with what laws empires rise and fall, why one race is always predominant, why the history of the world revolves in eccentric circles round Jerusalem, its true center, from Egypt to Assyria, Syria, and Palestine, passing then to Greece, Rome, and Carthage, at present taking in England, France, Germany, perhaps to turn, in the future, once more to the East.

We do not know why humanity overcrowds certain countries, nor why the intellectual life of the race centers round particular points—London, Paris, Berlin. Everywhere we hear complaints of overpopulation, and

yet there are lying fallow and comparatively uninhabited countries—like Mesopotamia, Assyria, Egypt, Northern Africa—which were once the most populous, richest, and most fertile in the world. In ancient times, when a country became overpopulated, thousands went out under the leadership of a man and a hero, and founded a new home. Where is there now a leader of men who would cry to the stagnating elements of our overcrowded countries—the tramps, the loafers, “the submerged tenth,” and the great army of the unemployed—“Follow me! We will seek out an unoccupied corner of the earth, and found a nation for ourselves!” We lack the courage and the strength for that, and excuse our weakness with the plea of “changed times,” “altered circumstances,” “political difficulties in the way,” “want of capital,” etc.

Nor can we understand why the aboriginal races—the North American Indians, the natives of Australia and Van Diemen’s Land, the Maoris of New Zealand—pine and dwindle and disappear from the earth as soon as they come in contact with our “Christian civilization.”

* * *

Now, let us ask ourselves, Does the history of the human race tell of progress, of retrogression, or of a moving ever in a circle? Who shall decide? The apostles of progress proclaim loudly that we are greater, cleverer, and more enlightened than our fathers, and carry conviction to the minds of thousands who know almost nothing of the past, and are, therefore, incapable of forming a correct judgment. But it has always

been so. Each century has believed itself superior to those before it. To many thoughtful minds it seems as if we could not boast of much real progress. With and in spite of railways and the telegraph, limited liability companies, repeating rifles, and torpedo-boats, wealth, peace, and happiness have not come to mankind; nor do our prospects for the future look any better in that respect. In spite of the boasted advance in statecraft and the art of government, in theology and jurisprudence, the tide of anarchy and socialism continues to rise, threatening to swamp society. Thrones and religions, beliefs and laws, are tottering; crime and idleness increase, and make a mock of God and man; medical and educational science are continually celebrating new triumphs, yet everywhere one hears complaints of the increase of nerve and brain disorders, short-sightedness and anæmia, of the growing insubordination and license of youth, and the consequent increase in juvenile crime. And in this century of humanity more and more deadly instruments of warfare are invented, so that in the next conflict of the nations the destruction of life will be such as the world has never seen. In short, with all the enlightenment and freedom from superstition, which characterize the age, discontent and crime, swindling and deceit, hysteria, insanity, and suicide are assuming alarming proportions. What a contradiction!

As far as we know, the Egyptians and Indians four thousand years ago were as healthy, perhaps more healthy than we are, as clever and intellectual. They were as we are: rich or poor, happy or unhappy, God-fearing or godless, at the same time logical in speech,

wise in council, brave in battle. They enjoyed their food and drink, had beautiful houses and suitable clothing, and besides all this they had wise laws, a good system of education, and lofty notions of morality. They bought and sold, planted and built, married and were given in marriage, loved and hated, lived and died like us; and when we read in ancient records of their doings we are constrained to cry with the Frenchman, "*Tout comme chez nous.*" The Egyptian mother four thousand years ago loved her son, and was proud of him, like the aristocratic lady or the working-woman of to-day. Young men then were athletic, active, and lively, and old men talkative, grave, or morose; in those days, also, lovers, like Sappho, Tibullus, Propertius, wrote sentimental poems to the object of their affections; there were gourmands and egoists, noble and vulgar souls, men of genius and fools, wits and bores. They ate garum where we eat caviare; they drank Cyprus wine while we drink champagne. If we go to the theater, they had their circus; they went to the forum, and we go to the exchange; they had their villas, and also occasionally stood in awe of their wives. Where lies the difference between us? "There is nothing new under the sun," says Solomon. "The thing that hath been, it is that which shall be; and that which is done is that which shall be done." (Eccl. i, 9.)

For all forms of existence and all phases of society are but varying manifestations of the human soul, eternal and unchangeable; and fashions only pass away to reappear in course of time. The Egyptians, too, had their elegant furniture, their luxurious bath-rooms, sunshades, and fishing rods, carved chessmen and sofas;

and ladies sipped their afternoon tea, or its equivalent, from dainty cups, and showed each other, with satisfaction and more or less envy, their rings and ear-rings, as we see depicted in Egyptian paintings.

And if human nature has remained the same, so also has the human body. The oldest known skulls of the so-called stone age are exactly like those of the present day. The noblest of them might, as regards size of brain-cavity, be those of modern savants, while the lowest types resemble those of the Papuans and Bushmen of to-day. The statues of old Greece display a perfection and harmony of form far above the average of the present day; and the fests of the knights of the Middle Ages testify to a degree of bodily strength and activity which we could not outdo.

As regards civilization, the great mistake lies in comparing the former condition of Germans, Gauls, and Anglo-Saxons with their present state. From the beginning the various grades of civilization have existed, not in succession, but simultaneously. We are highly civilized; but there are savages enough in Africa, New Zealand, and Australia. Centuries before the Helvetii built their lake-dwellings, which existed in Europe up till A. D. 750-1000, the palaces of Thebes and Memphis, Babylon and Nineveh, were the seats of a civilization, a luxury exceeding anything that this century has seen.

It is true that our skin-clad European ancestors lived in huts no better than those of the present-day New Zealander; but thousands of years before them the Egyptians had erected their pyramids, their giant temples and magnificent palaces, and had dug Lake Moëris and a Suez Canal. Nebuchadnezzar had built Baby-

lon on the Euphrates, which formed a square ten leagues in circuit. In the middle stood the temple of Belus, with its tower sixteen hundred feet high, surmounted by a golden statue of the sun-god; and surrounding it were twelve other temples dedicated to various gods. Gorgeous palaces extended for several miles along the river bank; and this magnificent capital possessed, too, the wonderful "hanging gardens," containing trees and plants of all kinds, watered by an ingenious system of machinery. Including fields for the support of the inhabitants in case of siege, the city covered an area more than twice that inclosed by the fortifications of Paris (J. Menant); and the whole was surrounded by a wall four hundred feet high and about one hundred feet broad, with gates of bronze, for the defense of the quays on the Euphrates. This was a metropolis in comparison with which our modern capitals—London, Paris, Berlin, irregularly built, and ending in straggling suburbs—cut a very sorry figure. In reading the description given of it by the trustworthy historian, Herodotus, we understand Nebuchadnezzar's exclamation, "Is not this great Babylon which I have built?" (Dan. iv, 30.)

It is true, the ancient Gauls lived on acorns and horseflesh; but long before their day, King Ahasuerus, who ruled over a hundred and twenty provinces, from India to Ethiopia, gave a feast to all his princes and nobles, which lasted a hundred and eighty days. "And when these days were expired, the king made a feast to all the people, . . . both unto great and small, seven days, in the court of the garden of the king's palace, where were white, green, and blue hangings,

fastened with cords of fine linen and purple to silver rings and pillars of marble. The beds were of gold and silver, upon a pavement of red and blue and white and black marble. And they gave them drink in vessels of gold (the vessels being diverse one from another), and royal wine in abundance . . . according to every man's pleasure." (Esther i, 5-8.) What are the royal banquets and court-balls of our day to a festival such as this? Take, too, the temple-fortress-palaces of Sennacherib, Assurbanipal, and Sargon, built on immense rocky terraces, with their seventy halls, their huge pylons and rows of gigantic winged bulls, and contrast them with the barrack-like residences of our modern sovereigns. The mere production of all this luxury presupposes a development of art and taste, as well as of trade and commerce at least equal to ours.

It is beyond a doubt that one thousand years before Christ the banks of the Seine, where now stands the capital of France, were covered by marshy forests, inhabited by the reindeer, the bear, the aurochs, and a few savages, armed with stone axes; but one hundred years before that time the Chinese astronomer, Tshen-Kong, had calculated that the inclination of the ecliptic= $23^{\circ} 54' 2''$ (at present $23^{\circ} 27' 22''$). And six hundred years earlier still, as we learn from the tablets of King Sargon of Agae, there was at Nineveh a public library, where, on writing down name and address, the librarian supplied scientific works; for example, "Tables and Observations on the Planet Dilbat or Tstar (Venus)." (Flammarion, *Les étoiles*, p. 759, and J. Menant, *Ninive et Babylone*, p. 141.)

It is true that in the time of Hengist and Horsa

the inhabitants of England, the ruling sea power of to-day, put to sea in carraghs or coracles (boats of wicker-work, covered with horse-skins); but seven centuries earlier proud Tyre was queen of the seas, and her merchants dwelt in palaces like princes, and did business with millions, like any American Croesus of to-day. Their magnificent ships, described by Ezekiel (xxvii, 5-7), sailed the seas, bringing from Spain silver in such abundance that they made their anchors of it, tin from Cornwall, amber from the Baltic, apes and peacocks from India; and they circumnavigated Africa under Hanno, discovering gorillas twenty-five centuries before the first was brought to Europe.

To turn to the Greeks. What they were as architects, and how far they surpassed us in sculpture, is very well known. What they accomplished in painting and music is a matter of recent discovery. On the tombs of El Farjum, two thousand years old, portraits, painted in wax and certain ochres, have been found in a state of excellent preservation. Some of them—one especially, the head of an old man with clear, thoughtful eyes—are not unworthy of our modern portrait painters. Then, of the oldest piece of Greek music, the Hymn to Apollo, dug up at Delphi, a connoisseur wrote, after its performance at Stuttgart: "The effect of the music is striking and very peculiar. Its solemn, long-drawn tones, which remind one of the lamentations of the Roman Catholic service, still inspire the soul to devotion. The hymn gives a high impression of the artistic merits of Greek music; and we must indorse the opinion of Reimann, who says: "The full choir, in full strength, with the whole orchestra of citherns and flutes, the splen-

did procession before the temple of Delphi, the sanctuary itself gleaming in gold, must have produced an effect grand in the extreme.' The Parisian critics, too, were enchanted with the music, and thought it resembled the style of Wagner, but was purer and more beautiful." At the same time we must remember that it is highly improbable that we have happened, in these portraits and the hymn, to light on the very best specimens of the art of that time. How many miserable productions of the nineteenth century may not one day be dug up!

We might fill volumes with a description of the civilization of the Indians and Egyptians, Assyrians and Persians, Phœnicians and Carthaginians, Greeks and Romans, their splendor and their power, their wise laws and ordinances, their architecture and their horticulture, their palaces and temples, their theaters and baths, their swift galleys, with brazen spurs, their well-disciplined and splendidly-armed phalanxes and legions, the treasures of a Crœsus, the luxury of a Nero, the banquets of a Lucullus. Books might be, and have been, written on their skill in the construction and erection of giant statues of bronze, like the Colossus of Rhodes, one of the wonders of the world, the fragments of which, eight hundred and eighty years after its fall, weighed seventy-two hundred hundred-weight. Plutarch tells us of the armor of Demetrius Poliorcetes, which withstood at sixty paces the missiles of a war machine. We read of ships, like the Alexandria of Hieros II (256 B. C.), as large as a modern ironclad, and the still larger one of Ptolemy Philopator, manned by four thousand sailors, of which Admiral von Henk

remarks: "The ancients appear to have understood better than we the art of binding together such masses of wood." And the man who constructed this giant was able, a few years later, to draw it upon land for repairs—no easy task. We might tell of their skill in weaving stuffs so fine that an Egyptian lady could entirely wrap herself in her shawl, or draw it through her ring; of the manufacture of colors so excellent that, after four thousand years, they retain their pristine freshness. If they had dyed with our aniline colors, they would have faded long ago. In the goldsmith's art, too, they attained great perfection, as we may see by the jewelry of the Princesses Hathor-Sut and Sent-Senbet, of the twelfth dynasty, lately discovered in the Pyramid of Dochscur—necklets of gold, amethysts, and turquoises, dainty golden shells, miniature furniture, and ornaments of Cloisonné enamel of wonderful beauty, works of which a connoisseur says: "They are unequaled in point of technical perfection and purity of taste by any work of this present age, proud as it is of its technical skill."

All attempts made in Paris to imitate a certain Etruscan brooch, representing bees on a flower, were failures; and this people understood the art of inserting false teeth by means of gold pegs, as is to be seen in ancient skulls. Another thing in which the ancients are unrivaled is the engraving of gems; for example, the beautiful Gemma Augusta, which has twelve figures in the smallest possible space, the Achates Tiberianus in Paris, and many others. There is no end to the marvels of ancient skill. The till recently neglected art of fish-culture flourished thousands of years ago in China, and also in Egypt, where the artificial Lake of Moeris

brought the Pharaohs large revenues from the fishing rights. These same Pharaohs had their enormous blocks of granite and porphyry sawn with diamond and sapphire saws three thousand years before the use of diamond borers in the construction of the St. Gothard Tunnel was hailed as a new triumph of civilization. And who has not heard of Solomon and all his glory?

If we turn to the New World, the same story meets us. Bernal Diaz, the companion in arms of Cortez, describes with enthusiasm the wealth and luxury of Mexico, the gold plate, the royal mantles, embroidered with humming-birds' feathers, and how the Spaniards, at the sight of the temples and palaces covered with sheets of gold and silver, were struck with astonishment and admiration, "although," he says, "we had seen in Spain, Seville, and Granada, the pearl of the world."

One must be either very ignorant or astonishingly self-satisfied to look down on nations which attained such a pitch of civilization simply because we nowadays travel by rail, send telegrams, and possess sewing-machines and photograph-albums.

But what has become of these mighty empires and their civilization? Where once stood Tyre, the queen of the seas, there are now but a few miserable fisher-huts; where the palaces of Nebuchadnezzar rose in splendor prowl now the lion and the jackal; Mesopotamia, Persia, and the neighboring countries, are, for the most part, desert; wretched Fellaheen live in clay huts in the shadow of the mighty temples of Egypt; marshes and sand cover the site of the once proud city of Carthage; and Mexico has sunk to be a dirty, third-rate little capital. Even in civilized Italy, the district once inhabited

by the mighty Etruscans, with their huge buildings and their wonderful goldsmith's work, is deserted on account of the fever-bringing Maremma.

What would the proud Phœnician merchants, or the princes of Carthage, Nebuchadnezzar, or Cyrus, or Alexander the Great think of the progress of mankind could they return and see the miserable condition of their once-flourishing lands, the granaries of the ancient world?

It is true that the English, the French, the Germans, the Russians—in those days unknown barbarians—have become civilized nations; but we must not forget that four hundred and fifty millions of Chinese, one hundred and eighty millions of Hindoos, and over one hundred million Africans, as well as Tartars and Arabs—in short, the half of the human race—have remained absolutely stationary. In face of these facts it almost seems as if the amount of intellectual power which God has dispensed to mankind were, like the heat force which the earth annually receives from the sun, constant in quantity, neither increased by use nor diminished by disuse. This gift of intellectual power has passed, in the world's history, from one people to another, and each has concentrated its efforts on the end which appeared to it most desirable, always with more or less success. The Egyptians aimed at founding a strong hierarchical and symbolical state; and they did so. Nebuchadnezzar desired absolute monarchy in all its splendor, power, and luxury, and he succeeded in attaining it. (See Dan. ii, 27, 28.) The Greeks wished to express in everything and everywhere the idea of beauty and harmony, and they realized their ideal. The object of the Romans was

to become masters of the world, and they did become so. To the Hindoos the world was an immense mystic poem; to the Egyptians it was the portico of eternity; to the Greeks, the temple of beauty; to the Romans, the city and camp of strength. We have made of it a factory and a counting-house; we have no grand, dominant idea, but we have our politics and our commercial treaties, our industries, our commerce, and our natural science. Professor Huxley says: "The best modern civilizations appear to me to be the manifestation of a state of humanity without any ideal worthy of the name, and not having even the merit of stability." (*Revue des Deux Mondes*, October, 1896.)

The ancients were at least our equals in the attainment of material enjoyments and the skill with which they applied matter and the forces of nature to their purposes; in the domain of intellect, also, they were assuredly no whit behindhand. Solon, Plato, or Pythagoras, Pindar or Sappho, might appear to-day, in modern clothes, in the salons of London or Paris without exciting any astonishment. Their behavior would be as refined as ours. After they had had time to look about them and take notes, they would delight us, as they did their contemporaries, by their brilliant conversation on art and politics, life and literature, by their originality, their wit, and humor. With little trouble, Aristotle would feel quite at home with our modern science; Hannibal, whom a judge like Napoleon considered the greatest general of all time, would soon familiarize himself with modern tactics; Archimedes with our steam-engines and other inventions; and they would stand out intellectual giants, as they did in their

own day. Were the men whose lives Plutarch relates inferior to us in nobility of thought, in courage, resolution, and steadfastness, in virtue and intellect? The great historian, Ranke, looks upon the nations as large families, which grow up, flourish, and then die out without their particular gifts and qualities being transmitted to others. It is a great mistake to suppose that because we have the advantage of having at our disposal an accumulation of so many millions of facts, amassed during so many thousands of years, we are necessarily wiser than our ancestors. The value of knowledge is measured by the use which a man makes of it. Newton deduced the law of gravitation and its consequences from a fact so simple as the fall of an apple. What greater discovery could the most learned natural philosopher of to-day make with the accumulated wisdom of centuries on which to draw?

There is an infallible standard by which to measure the intellectual development and the mental level of a people, and that is its language. Is our speech more poetical than that of Homer and Sakuntala, more philosophically logical than that of the Phædo, more dramatic than that of Sophocles, more concise and to the point than that of the Spartans? What modern writing surpasses, or even equals, in beauty and loftiness of expression the Psalms of David, or the Book of Job? And we can not get away from the fact that our classical education, and modern culture in general, is based upon the study of Greek and Latin, and the wisdom of the ancients. Schopenhauer considers that "the gradual degradation of languages, which are the more perfect the older they are—Sanskrit, for example—is a weighty

argument against the theory of the continual progress of mankind." Even the most learned philosophers and thinkers acknowledge that we are no nearer a solution of the great problems of life, the great riddles of the universe, than the sages of old. The great astronomer, Proctor, concludes his book with these words: "I would ask, in conclusion, whether we have now better reason than the astronomers had of old time to consider the mysteries of the universe as fully revealed to us and interpreted. We know much that was unknown until of late, and we have been able to understand some matters which once seemed inexplicable; but the star-depths as we see them now are even more mysterious, as well as far more wonderful, than as displayed to the astronomers of old." (Our Place Amongst Infinities, p. 233.)

Dubois-Reymond says: "We are as much puzzled by the question, 'What is matter?' as the Tonic physiologists of old. The nature of the material and of the spiritual world has become no less incomprehensible since Plato and Aristotle, since Epicurus, who knew the immutability of force and of matter." And elsewhere: "Mankind is no nearer understanding force and matter, nor the deduction of spiritual phenomena from material conditions than it was two thousand years ago, in spite of all the discoveries made in natural science. It never will get any nearer." (Ueber die Grenzen des Naturerkennens.)

But we might have spared ourselves this discussion, and have simply put the question, Is mankind happier now than formerly? For increase of happiness is surely true progress. Different as the opinions and desires of men may be, on this point they all agree; their dearest

wish is to gain happiness, either by means of art or science, through honor or power, through riches or voluntary poverty. "No, so-called progress has not brought us happiness," answer the leaders of human thought, as well as the millions who, discontented with their lot, aim at overthrowing the existing order of things, and founding a new state of society.

Pessimism is the distinguishing feature of present-day philosophy. Kant calls life "a time of trial to which the majority succumb, and which even the best do not enjoy." "Fools," says Schopenhauer, "take the world as an intense reality, and believe that the object of life is earthly happiness, which is, after all, but an illusive, disappointing, miserable, perishable thing, not to be bettered by government or legislation, by steam-engines or telegraphs."

Another German philosopher, von Hartmann, sees the only prospect of salvation for the world in a general conviction of the folly of wishing and the misery of existence, leading man to take the matter into his own hands and obtain peace and freedom from pain in the only way possible. Suicide is then to be set up as the goal of life! Can that be called progress which drives humanity and its own apostles to such a cry of despair?

It is the apostles of progress among the naturalists who contradict each other most strongly. On the one side they preach the final triumph of light and science; on the other they teach that the earth, as well as the solar system—in fact, the whole universe—is moving onward to a death from cold; for thousands of years before that freezing humanity will gradually work

towards the tropics, and finally eke out there a miserable existence. Thus Spiller writes, "There is practically no doubt that the last men will live as equatorial Eskimos." The Darwinian Clemenceau prophesies, as we shall see later on, in virtue of the theory of evolution, the end of humanity "in the greatest misery." What an idea of progress, what an end to all light and knowledge!

It is a remarkable fact that all religions are at one in the belief that the advance of mankind is not towards something better. All lay stress not only on the fact that man has fallen from an original state of blessedness, but also teach that he continues to decline. Thus the Greek and Roman mythologies told of a golden, a silver, a copper, and an iron age. So, too, the Indian religions taught in the time of Manu a decline of the world from its beginning through its four ages, of which the present, dating from the Deluge, is called Kali-Juga, the Age of Strife. In the same way the Bible gives in the dream of Nebuchadnezzar a picture of the course of the world's history in the image with golden head, silver breast, brass body, and legs and feet of iron and clay. And all agree that after the final catastrophe "the Father of the fathers of the gods," as the Egyptians call the Great Unknown, will have pity on his creatures, and will create a new world of light and happiness.

As far as mere civilization is concerned, we see from the history of the world that the amount of intelligence with which the successive leading nations have pursued their various aims—the one, luxury; the other, power; the one, art; the other, trade and commerce—has been always almost constant in quantity. Since the Deluge there has always been, somewhere on the earth, great

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But what of the primitive men of the Stone and Bronze Age?

On this point a slow but certain reaction is setting in. The thousands of years during which it never occurred to palæolithic man to put a handle to a flint in order to make an ax of it, are the product of the imagination of certain savants. Such an assumption is out of all proportion to what we know of human development. The historic age as regards Europe reaches back at most three thousand years, and this period of time carries us back, as can be proved, to the Bronze, if not to the Stone Age. That man had remained for at least fifty thousand years previous completely stationary, is very hard to believe. In that case this prehistoric man must have been far less capable of evolution than the dog or the rose; in fact, a being quite different from the man of to-day. It is as if a baby after remaining fifty years quite undeveloped were suddenly to begin to walk and talk. In other respects, too, these assumptions are not tenable. We have learned that many stages of civilization which we have been accustomed to regard as successive were really simultaneous; civilized and uncivilized races have always existed side by side. Even the learned historian of materialism, Albert Lange, says: "The theory that the periods of the mammoth, the primitive bear and the reindeer lasted for several thousand years in succession is no longer considered tenable. All these animals lived at the same time, and the state of

their bones gives no indication of their age." And he ends by confessing impartially: "When the geologist, Fraas, comes down to periods embraced by the six thousand years of Biblical chronology, we have no proofs with which to oppose him." (*Geschichte des Materialismus.*)

Ranke, in his history of man, says, "We have not yet found traces of Tertiary man," and elsewhere, "The oldest traces of humanity do not reach further back than the Deluge." (*Der Mensch.* Leipzig, 1887.) Boyd-Dawkins goes still further, and proves that in many cases primitive man was not contemporary with the animals whose bones are found in the caves he inhabited, but that he lived at a later period; even at the present day, not only in the interior of Africa, but also in France, on the banks of the Loire, hundreds of human beings lead a miserable existence in caves. As for the flints, Robert considers those of the most celebrated station of the Stone Age, Grand Pressigny, to be the remains of a factory of musket-flints of the last century; and even the well-known geologist, Elie de Beaumont, shares this opinion. Be it right or wrong, it shows clearly how impossible it is to determine the age of these stone implements with any exactitude, and how purely supposititious these periods are. Marlot reckoned eight thousand years for the Bronze and Stone Age together, while the investigations of Troyon, the great authority on the lake dwellings, do not take him farther back than 1500 B. C., and Professor Fraas dates these settlements of Germanic tribes on the lakes at 600-800 B. C., and adds: "Nothing compels us to place the beginnings of the lake-dwellings prior to 1000 B. C." (*Vor der Sint-*

flut.) They are then coeval with Solomon's Temple, and centuries later than the height of Egyptian culture! Some authorities make the lake-dwellings exist up to the time of Charlemagne. It is a fact that the so-called Stone Age, and probably also the reindeer period, lasted in some parts of Gaul to the time of Cæsar. It has existed with the Maoris of New Zealand into the nineteenth century. The peasants of South Tyrol use the very same flints as the men of the Stone Age to make a light, and the fishermen on Lake Zurich use the same stone rings as the lake-dwellers in the time of Christ, only, as Troyon told the author, those of the present day are not so well made! Another proof, by the way, that imperfect implements and products are not necessarily of older date than the better ones. What conclusions will the archæologists of the future draw from these facts, and how many centuries will they intercalate between these peasants and fishermen and the highly-refined visitors to Meran and wealthy inhabitants of Zurich?

How valueless are the conclusions drawn from certain skulls is shown by what follows. The celebrated skull found at Engis in 1831 was pronounced by Professor Vogt similar to that of an ape; Lyell believes it to be that of a Caucasian; Professor Huxley considers it so beautiful that it might have belonged to a philosopher; the Petersburg anatomist, Theodor Landzert, compares it to the classic skulls of the handsome Greeks! (Ranke, *Der Mensch*, page 443.) Virchow writes of the famous Neander skull, which was supposed to be the type of antediluvian, ape-like man: "Even if we take it as typical of a race, which I consider inadmissible, we can not find in it any approach to the skull of an

ape." Dr. Pruner Bey measured its capacity, and found it greater than the present average; he considers it that of a Celt of historic times; Professor Davies believes it to be that of an idiot who probably lost his life by falling down the chasm in modern times! Professor Fraas, himself an authority, is right when he ridicules these results of science, and adds: "These diverse views of men of science afford the best proof that we know next to nothing about these primitive men." (Vor der Sintflut, page 478.) Skulls no more bear a date than other bones or stone axes, and in all ages there have been round and long-shaped skulls, clever and stupid heads, and deformities and idiots, too! "We can positively maintain," says Dr. Pruner Bey, "that there is no type of skull which is not to be found in the cave of Solutr ." It is quite impossible to construct theories of racial peculiarities and differences from the shape of skulls. Quite recently two anthropologists, Ammon and Poschinger, had a serious dispute as to whether the skull of Bismarck were long or round, whether he were dolichocephalous or brachycephalous.

But if primitive man was a contemporary of the cave-bear and the mammoth, as is supposed by Figuier and others from the bones and from a drawing of the latter scratched on ivory which was found in the cave of Pruniquel, that is no proof that they are earlier than the Biblical chronology. It is rather highly probable, and we have no proof to the contrary, that the mammoths still preserved with skin, hair, and blood frozen in their arteries in the ice of the tundras of the Tamir, the Lena, and the Petchora, and on whose flesh Tunguses and Jacutes still feed their sledge-dogs, whose tusks, too,

are exported in large quantities to London, are contemporaneous with the Deluge, that they perished, in fact, during the Deluge. According to the Bible, then, primitive man lived side by side with these animals for fifteen centuries, a period which amply covers the Stone and Bronze Ages all over the earth.

The idea that these prehistoric men in some degree resembled monkeys has been shown to be false. Figuier writes of the Mentone skeleton, which is held to be the very oldest of human remains: "The similarity of its skull to the finest of to-day is surprising. The facial angle does not differ in any way from the type of the most intelligent races. What becomes, then, we ask, of the supposed descent from the ape?" (*L'homme primitif*, page 119.)

These antediluvian men were, on the contrary, powerful natures, full of indomitable strength, as they are described in the Song of Lamech and Genesis v, and as the most ancient skulls and skeletons show; for example, those of Cromagnon, of which Broca says that in the lower half they display an almost bestial force and greed, but in forehead and cranium the highest and finest formation with great brain capacity. These are the long-lived giants who, with their combats against lions and monsters, against each other, and in the case of the Titans against the gods, figure in all mythologies as demigods, like Hercules, Theseus, Odin, Thor; or even as gods, like the grandson of Cain, Tubal-cain, an instructor of every artificer in brass and iron (Gen. iv, 22), whose name is preserved in the Roman Vulcan or Vulcain. This generation of giants, as the Bible relates, built towns, worked in all kinds of metal, and invented

musical instruments; they filled the earth with violence (Gen. vi, 13), so that the inferior races fled before them to distant countries, and lived in a wild state in caverns. It is almost certain that the bones of the few hundred cave-dwellers of Cromagnon, Aurignac, and Solutr  do not represent the whole population of the Gaul of their day, but only exceptional cases; for Professor Fraas believes that these hunting tribes were accustomed to bury their dead. Those strong ones who as Kebirim, Cabires, received divine honors in the East and later on in Rome, were capable of building Cyclopean cities, an ark of more tons' burden than our iron-clads, and, after the Deluge, the Tower of Babel; why, then, could they not have at once constructed pyramids and temples in Egypt without requiring centuries for their gradual civilization? Humanity has never lacked an intellectual head; there has always been a nation to take the leading place.

We have no reason either to flatter ourselves that the whole of mankind will ever be civilized. In the course of the last fifty years we have seen ourselves forced to go back from the idea that savage tribes are to be made into cultured nations by means of laws and regulations, European clothes, customs, and education; on the contrary, we have seen how some have even died out in consequence. On the other hand, anarchists, nihilists, communists, and the thousands who live in London and other great cities under conditions worse than that of savages, mere human rats, all these bear testimony to the powerlessness of the civilizing influence of our day. Then, too, the effect of the social revolution prophesied and hoped for by the anarchists will be anything but civilizing.

As the guiding and thinking part of man, the head, is about a tenth of the body, so a similar proportion of mankind seems to be destined to be the leaders of its thought, and a change in this proportion would be as fatal as if the brain were developed at the expense of the other organs. It will probably always remain so; but to pity the elementary portion of mankind as if a wrong had been done them is as unreasonable as to pity foot or arm for not being brain or eye. Happiness lies neither in civilization nor in so-called culture, but in morality and the fear of God. This we see exemplified in the inhabitants of the peaceful valleys of Switzerland, the Tyrol, and Norway, as compared with the devotees of Fashion, the plutocrats and bureaucrats of our capitals. A simple stone-mason may be as happy as a Michael Angelo; in fact, has a better chance of being so,—as Bismarck pithily observed, he had known many a contented forester, but never a contented minister or politician. And as regards eternal blessedness, it depends neither on earthly position nor on culture, and is promised rather to the poor than to the rich and great of this world.

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In the question of progress, many date it from the advent of Christianity, and attribute to our religion a powerful, civilizing mission. We do not believe in any such mission. If Christ's object had been to civilize the world, how easy it would have been for him to have appeared on earth as the son of a Roman emperor (that need not have prevented his death on the cross)! As Sovereign of the world he could have introduced a new

era of Christian civilization and intellectual progress, with a perfect form of government, truly humane laws and abolition of slavery; an enlightened patronage of art and science; the promotion of trade, commerce, and industry. A few words would have revealed the knowledge of steam, electricity, and perhaps other forces yet unknown. He could have solved all social problems; he could have put an end to all bodily suffering by some rational remedy, seconded by miraculous agency, by the constant supply of food-products.

All this lay in his power "for whom are all things and by whom are all things." (Heb. ii, 10.) But how different from the reality! Christ ignores completely the arts and sciences, politics and legislation, and refuses to interfere even in a matter of right, with the words, "Man, who made me a judge over you?" And when he stands before the representative of the most powerful empire of the world, instead of pointing out to him the enormous advantages of a civilizing Christianity, he answers briefly, "My kingdom is not of this world."

"What doth it profit a man if he gain the whole world and lose his own soul?" If a man is converted he is civilized enough; if he is not converted, neither education nor civilization is of any use. That is Christ's standpoint. Not civilization, but everlasting life, is what Christ brought to man; but his gift was refused. A little consideration will show that a nation composed only of true Christians would not have made any great advance in art and commerce, in trade and industry. Content with a modest competence, looking upon things eternal as their chief care, and things temporal as only of secondary importance, such a community would not

have troubled about the invention of railways, the telegraph, the telephone, etc., as we may see in the case of the Moravian brethren, the Puritans, the Huguenots, Geneva under Calvin. The Christian says like his Master, "My kingdom is not of this world."

Those who, even while denying the Divinity of our Lord, yet regard our present civilization, our art and science, as the product of Christianity, pay it a very poor compliment; for in that case Christian art and Christian science, the culture of to-day, ought *a priori* to stand as high above all that paganism has produced as Christian truth does above heathen error. Every one must admit, however, that this is not the case. The Christian churches, even St. Peter's and Cologne Cathedral, do not surpass the Parthenon, the Temple of Diana at Ephesus, that of Karnak, or the splendid temples of India, as Christianity does heathen religions; Raphael's and Murillo's Madonnas as works of art are not superior to the Medici Venus or the Apollo Belvedere, nor Michael Angelo's Moses to the Zeus of Phidias. As for the art of Protestantism, as exhibited in the stained glass, carved pulpits, and embroidered altar-cloths of our churches, it is far behind Catholic art, so that if we push this argument to its logical conclusion we shall be forced to confess that the former is inferior in Christian inspiration and truth.

Art and Nature are certainly divine in their origin, and the latter contains all the laws of the former. But we must not confuse Divine and Christian. The universe, the great revelation of God to all mankind, is divine; the special revelation of God in Christ by the Holy Spirit to the individual soul is Christian. As there

is no such thing as Christian nature, Christian art is simply an art which devotes itself to the service of religion. "The celestial world painted in earthly colors! I despise such art," says a German writer. And the realistic painter, Courbet, is not wrong when he says: "Let no artist paint me an angel nor a portrait of Christ! He has never seen either!"

It is not chance, but the purpose of God that while portraits, statues, and coins of the rulers of Nineveh, Babylon, and Rome, and even the mummies of certain Pharaohs, have come down to us, we do not possess any pictorial representation of any apostle, or prophet, or of our Lord himself. For this reason any attempt to illustrate the Bible is open to objection. A natural and realistic illustration, if such were possible, would draw the mind from the spirit of the words to fix it upon eternal; an idealized picture is untrue. God knows why he did not give us an illustrated Bible; he could easily have inspired one or more Bezaleels for the task. The whole Bible tells of a release from the bonds of matter and earthly forms, from the commandment, "Thou shalt not make to thyself any graven image," and the prophecy, "He hath no form nor comeliness," to the words of Christ, "God is a Spirit, and they that worship him must worship him in spirit and in truth," and the utterance of St. Paul, "Though we have known Christ after the flesh, yet now henceforth know we him no more." (2 Cor. v, 16.)

As regards the morality and humanity of professed Christianity, things were worse at the court of Constantine than under Titus, Adrian, and Marcus Aurelius, and worse still in the so-called Christian Rome of the

Borgias. The Middle Ages, with the Inquisition, the witch-trials, and the Thirty-years' War—all of them the result of a mistaken idea of Christianity, and three of the most horrible phenomena of history—were, from the standpoint of civilization, a great retrogression from Egyptian, Greek, and Roman times. Goethe, Schiller, and others, were not altogether wrong in expressing their regret that Christianity—that is, what they falsely regarded as such—had not shown itself capable of producing conditions so beautiful and harmonious as classic antiquity.

It is absurd to maintain that Christianity civilizes and makes happy a people who are only Christians in name. Faith brings happiness here and hereafter, but only to him who believes, certainly not by a sort of infection to the neighbor who ridicules it, or hates and despises it. He has only—and this applies equally to nations—the greater condemnation. It would be a bitter mockery to hold up to our admiration as a result of the doctrine of Christ the culture and civilization of the professedly Christian nations of Europe, from Archangel to Gibraltar, with their powerlessness to stem the rising tide of anarchy and socialism, their swindling transactions, their chosen representatives in many cases antichristians or even atheists, their materialistic science and antichristian literature, their sometimes immoral and sensual art, their secret or open enmity to God.

The world has always been, and will always be, the enemy of God. Christ sent his disciples into the world as sheep among wolves, sent them as a light to shine in darkness, as a salt to prevent corruption; and that

is what they have been for eighteen centuries. And who can deny that they have exercised an ennobling and refining influence on their surroundings? But it is just as true that to civilize the world was never their mission; and whenever they have been led away by the idea that it was so, they have found the fountain of Divine life sealed.

Christ would certainly have been glad to comfort his apostles on his departure with the assurance that they would convert the world and bring it earthly happiness, if it had been possible. On the contrary, he foretells that till the end they will have to endure hatred, tribulation, persecution, and asks them, "When the Son of man cometh, shall he find faith on the earth?"—a question which, in another place, he answers in the negative: "As in the days that were before the flood they were eating and drinking, marrying and giving in marriage, until the day that Noah entered into the ark, and knew not until the flood came and took them all away, so shall also the coming of the Son of man be." (St. Matthew xxiv, 38, 39.) With this grand likening of the future end of the world to the destruction in its sins of a former world, full of violence and wrong, he destroys the dream of Christian progress.

And why is this world's history to end with the terrible judgment on mankind and the universe which Christ describes in St. Matthew xxiv and St. Luke xxi, and of which the Revelation is full, if the world and humanity are growing ever more civilized, more Christian? The world is not, and never will be, the Bride of the Lamb.

The Bible gives us two pictures: that of the multi-

tudes going through the wide gate that leads to destruction, and that of the people of God under various types, the God-fearing men in the days before the Flood, the chosen people, and, finally, the Church of Christ, walking in the narrow way that leads to everlasting life.

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Many will say that this is a very gloomy view to take. Are we to believe that humanity moves ever in a circle, without advancing a step; that it is to thirst forever for a happiness which is unattainable? What a dreadful idea! We answer, Who is to blame for it? God most certainly not! Does he order men to destroy one another in bloody wars, and to spend annually, in Europe alone, millions of money in training millions of young men to kill as many as possible of their fellow-creatures? Is it his will that men should blunt their sensibilities for what is true, good, and beautiful by making themselves slaves to pleasure and avarice, to foolish pride and ridiculous vanities, to conventional lies and social etiquette? Are we taught in his Word to lead narrow and artificial lives, to injure our own health and that of our children, and, by treading down all rivals and competitors in the race for wealth and fame, do infinite harm?

On the contrary, the God and Father of all men commands, warns, begs us, individuals and nations alike, on every page of his Word, to consider what makes for peace, to do justice, to eschew evil, to love one another, to bear one another's burdens, to forgive and bless instead of cursing, and promises that He will then bless

us beyond all desire and understanding, will keep far from us all evil and danger, sickness and pestilence, and all that troubles; "for he doth not afflict willingly nor grieve the children of men." (Lamentations iii, 33.)

And that we may not doubt his power to do all this, he bids us note: "The Lord's hand is not shortened that it can not save, neither his ear heavy that it can not hear; but your iniquities have separated between you and your God, and your sins have hid his face from you, that he will not hear." (Isaiah lix, 12.) "Return, saith the Lord, for I am merciful, and I will not keep anger forever." (Jeremiah iii, 12.)

But who believes him? We are very wise and very clever, and nothing is impossible to modern science. "We have no need of him!" cries a blind and perverse generation. With commercial treaties and rational agriculture we can make sure of our daily bread. We might even manufacture it chemically. We will save ourselves from death with tuberculine, anti-pyrine, and serum by inoculation for all diseases. We will solve the social problem with newspaper articles and evangelical congresses. We will master the Word of God by the Higher Criticism. We will find out by free investigation whether he exists at all! We shall get on very well by ourselves.

What wonder that, with such ideas, man makes no progress! How can the creature live separated from the Creator? As there is for the earth no other source of light and heat than the sun, so there is for mankind no progress possible save that contained in the words, Nearer to God.

The perversity of man can never hinder or prevent

the accomplishment of the Divine purposes. The Bible tells us nothing of the coming time when, thanks to the march of science, art, and inventions, trade and commerce, the earth will resemble an immense hotel, furnished with every comfort and luxury that skill and hygiene can suggest, lighted by electricity, providing an enlightened humanity, emancipated from the yoke of superstition and prejudice, with chemical foods at low prices; but, on the other hand, neither does it know anything of the theory that, in so many million years, mankind will be compelled, by a cosmic process of refrigeration, to abandon the present centers of civilization, and will be driven, by degrees, to the equator, where they will eventually perish miserably from cold. God has appointed to everything a time. The ephemera and the flower, the animal and the tree, the individual man and the nation, each has its time to be born and its time to die. Will it not be the same with the human race?

Scripture points definitely to the fact. Daniel, to whom God revealed the destinies of nations, prophesies that after the four empires—the Babylonian, the Persian, the Greek, and the Roman (the last interrupted by the time of wrath against Israel, to rise up again in the ten kingdoms of Antichrist, corresponding to the ten horns of the fourth beast and the ten toes of the statue)—no other empire will follow; but the God of heaven will give the kingdom to the people of the saints of the Most High, whose kingdom is an everlasting kingdom. (Daniel vii.) Prophecy tells us further that the Messiah, the Christ, will come again, to rule over this kingdom. Finally, we are warned not to de-

spise the prophecy, and taught what signs will herald the end of the world, with the assurance that in the last days "many shall run to and fro, and knowledge shall be increased." (Daniel xii, 4.)

Though it is not expressly taught, there is much to be said for the belief held by the Jews that, judging from the analogy of the creation—the Mosaic law—and the duration of the above-mentioned empires, the history of humanity comprises a symbolical week of six thousand years of labor and pain, to be followed by a millennial Sabbath of rest and refreshment. God assures us in his Word of a speedy, complete, and glorious fulfillment of all his promises, but only after terrible judgments, as set forth in the Revelation. For whose fault? Man has for six thousand years defiled the earth, stained every stone of it with blood, filled the world with hatred and violence, defiance and uncleanness. Such guilt demands punishment. Therefore, when the day of judgment arrives, the powers of heaven shall be shaken, the sun shall be darkened, and the moon shall not give her light; and there shall be lightning and thunderings, earthquakes and great hail, famine and pestilence; for the seven angels shall pour out upon the earth the vials of the wrath of God.

But when his lightnings shall have destroyed the wicked, God will make a new heaven and a new earth, and the eternal Te Deum shall rise from the redeemed, accompanied by the songs of the whole creation, the harmony of the spheres, and the harps of angels.

And this is progress—a progress which will satisfy all human longings as the most beautiful dreams of all its earthly apostles could never do.

CHAPTER II

Evolution and Modern Science

IT will no doubt have struck many as strange that I have, in the first chapter, denied that mankind has made any advance; for progress is undeniably the law of creation. Each being, every organism, is subject to a necessity of becoming other than it is, of developing—in a word, it grows. Not only the animal and the plant, the crystal, too, obeys this law; and it is difficult at first sight to understand why humanity, which, as history shows, forms an organic whole, alone does not follow it. The answer—and it is one which gives the key to many an enigma of life—is, that man is not in his original and normal state: he is no longer as God created him. He who denies the fall will find no solution to the mysteries of life; he who believes in it will at least see a reason for their existence, and will recognize why he can not solve them. It is beyond a doubt that man, without the fall, would have grown in knowledge, in goodness, and in happiness, would have become, in fact, more and more like God. Enoch, the man who walked with God, and whom he took to himself after he had lived the great cycle of three hundred and sixty-five years—a year for a day—is an example of a human being who fulfilled his destiny, and a type of what the destiny of mankind was to have been. We

should have ascended, sinless and deathless, to ever greater heights of knowledge and bliss. But man fell away from God, from light, from the source of all truth and all knowledge. To what depths he fell it is beyond the power of man to measure or to realize. We, born in sin, poisoned by sin, can have no conception of the nature of a sinless being, living in direct contact with God, nor the bliss of a paradise in which God associated freely with his creature. It is a sufficient proof of our fall that we are accustomed to think of Adam as a happy, innocent child. He who was capable and worthy of close communion with the great Sun of the universe, the great First Cause, stands *ipso facto* far above the greatest genius of all time. To take an instance from the Bible, we read that Adam gave names to all living creatures—truly no easy task! Should we be equal to it if God suddenly transported us to Jupiter or Saturn, and, making thousands of creatures, entirely strange to us, and all different, pass before us, ordered us to name them?

It is true that progress—that is, progression towards God, a progression which is only possible in so far as God draws his creature to himself, and the creature lets itself be drawn—is, through all forms of existence, from the atom to the cherub, the fundamental law of life. This progression received a check at the fall. But, as God never wastes time, he is using this pause for the evolution, the development of mankind in good or in self-chosen evil; for the growth in knowledge of self, leading to the ultimate attainment of a higher goal. This, and not the attainment of new and higher earthly forms, is the object of existence. Be-

fore the Deluge the dominant idea was that of individual strength, of brute force. This period was, according to the Cabala, the two thousand years of the *tohu*, to which succeeded the two thousand years of the law. Then were to follow the two thousand years of Messiah, and, after these six days of work, the great Sabbath. After the Flood we find the instance—unique in history—of the whole of mankind uniting for one purpose, the building of the Tower of Babel. This is followed by the idea of a peculiar people of God, chosen that in them might be seen the progressive revelation of great principles. They received from heaven the Divine law. Then there was a gradual development of successive ideas: that of the theocracy, the judgeship, the kingdom, that of the office of poet (which, to quote Dean Bradley, “holds its place among the appointed means for the Divine education of the race”), as manifested in David, of sage and philosopher in Solomon, followed by that of seer and prophet, with their warnings and predictions. After the rejection of Israel, four ruling ideas are set forth, symbolized by the four beasts and the four metals of Daniel’s visions—this latter image met with in more than one mythology. After the fall of the Roman Empire, the idea of the Church and an earthly vicegerent of Christ was evolved, to make way, finally, for that of the Reformation. These successive ideas are not, as a pessimistic Christianity seems to believe, repeated fruitless attempts of God to draw mankind back to himself, till, weary and full of wrath at their perversity, he will bring about the final destruction of the world. On the contrary, they are successive stages, predetermined and directed by God, in the evo-

lution of those germs of evil contained in the fall; and they afford him an opportunity of displaying his power, his wisdom, his justice, and his grace. And this must continue till, at the appointed time, the whole mystery of iniquity shall be revealed (2 Thessalonians ii, 7-12), and God will bring to light, by a final judgment, the hidden things of these successive evolutions, showing to angels, to devils, and to men what new creations of grace and truth have resulted from them. Thus Satan, believing himself the conqueror, will find himself vanquished, and the mystery of God shall be finished. (Revelations x, 7.)

Running parallel with the evolution of these great ideas expressing the relation between God and man there has always been a corresponding development of human ideas. Each great people is really only the evolution of a great idea; and its great man, or men, are those who best exemplify that idea. As we have already said, ancient Egypt had for ideal the well-regulated hierarchy, at its head the priest-king, and her strength lay in the ever-present thought of eternity. Babylon represents absolute monarchy by the grace of God (Daniel ii, 37, 38); Greece symbolizes the idea of beauty; Rome, as its name indicates, that of strength and power; the barbarian nations, natural vigor. The civilized nations of to-day aim at a thorough knowledge of natural science, while the twentieth century will have as its characteristic feature the development of psychology and spiritual intercourse. Who dare maintain that any one of these ideas is nobler or higher than the others? All are beautiful, great, and divine, and all will have their place in the new creation: for

"they shall bring the glory and honor of the nations into it." (Revelation xxi, 26.)

Evolution is not progress in the sense that a thing evolves gradually of itself into something higher and different. It is a growth, a development, a progressive revelation, not of a general principle, but of individual principles, as the oak-tree grows from the acorn which even in the germ contains all its forms, as the child becomes the man, possessing the same faculties, qualities, and virtues, but developing them. From the Biblical and historical point of view, the march of humanity is a series of consecutive evolutions, more or less independent of one another, and by no means implying general progress. It is in this that the Biblical idea of humanity differs from the Darwinian.

We can not believe that God created a tiny cell containing all the powers and germs of the future creation, and then looked on while this seed, this egg, developed under the influence of natural forces, circumstances, and accidents, into thousands of varied, beautiful forms, each perfectly adapted to its environment. That he could have done so is beyond doubt; for we believe in an Almighty God. But in the first place, his Word, in which we also believe, declares that he created all things in succession, each after his kind; secondly, the study of geology and palæontology proves that it is so. The evolution of the universe is the pronouncement by God of a succession of principles, each higher than the last: "And God said." We believe that the Creator of heaven and earth spoke in words of thunder, while the world of angels listened in expectant amazement, "Let there be light!" created light—

that is, as distinguished from heavenly light. And on the five successive days of creation God pronounced great names, nouns until then unknown in their earthly sense to angels and cherubim: day, night, sea, land, herb, seed, fruit, fowl, fish, reptile, cattle; and, finally, the Elohim gave utterance to the still higher word, "Let us make man."

Then there began a pause in God's work of creation—the Sabbath of his rest—and man will remain such as he is until he "makes all things new," and is best fulfilling his destiny by studying all the conditions of his own nature, and that of creation in general, in searching out "by wisdom concerning all things that are done under heaven; this sore travail hath God given to the sons of man, to be exercised therewith." (Ecclesiastes i, 13.)

But when the great evolution-period of humanity is over, God will resume his work, and through the æons will bring his creatures ever nearer to himself in successive creation-periods, interrupted by Sabbaths and jubilee years, as symbolized in the law.

In the meantime man must seek to assimilate, according to the amount and quality of his powers, all of Divine given to him in nature and revelation before he is called by God's creative word to a higher stage of existence.

The amount of knowledge which a man may obtain by study is not unlimited. Nature certainly affords material enough to work upon; for in each individual atom, crystal, plant, animal, man, are contained such deep and eternal Divine truths that it will be one of our delights in eternity to read, understand, and admire them.

A being of a higher order would require hundreds, nay, thousands, of years to exhaust the knowledge contained in a single pebble; for it comprises all physics, all chemistry, all the mysteries and laws of matter, as well as the history of this particular individual from its creation.

But man, blind, deaf, and dumb through sin, can only look at nature in a paltry, egotistical sort of way, understanding it only as it affects himself; and he can not get much farther; for, like a weakly, new-born child, too much of anything is injurious to him. He can only attain to a dim conception of the eternal principles of nature; for God gives him his intellectual food by measure.

When, therefore, man has exhausted his study of this earth, when it is borne in upon him that verily "there is nothing new under the sun," when the question, "Is life worth living?" comes to be generally asked, the end can not be far off. God's gift has been assimilated, the class is finished, and, before the entrance into the next, the great examination must be passed.

Now, it can not be denied that in the present day there is a widespread feeling that we have exhausted subjects and forms in many departments; for example, in poetry and the dramatic art; in sculpture, which has represented man, woman, and child to satiety, so that the individual portrait has become the thing to interest. It is the same with painting. Madonnas and Descents from the Cross, genre pictures, and still life fail to arouse any enthusiasm. New schools seek after something fresh, and, in the pursuit of their object, fall into the fantastic, the unnatural, the revolting. So, too, with the novel. The various types have been done to death.

Insanity, vice, and crime, a sensual mysticism, psychological vivisection, are the fashion at present, because they are at least something new. Even architecture, the art which, in former days, was almost exclusively practiced in the service of the Deity, seeks bizarre forms, to avoid the continual copying of the classic and the Gothic. It is the same with regard to spiritual things. The lack of interest in philosophy is chiefly due to the feeling that all there is to say in the matter has been already said; and as regards religious questions, except the Salvation Army, a few feeble attempts to revive Buddhism, and the efforts of a few women, like Mme. Blavatsky, Mrs. Baker-Eddy, and Marie Corelli, in propounding absurd theosophies, they arouse little or no interest in the majority of mankind. We can hardly realize a time like the days of Luther, when the question of religion was, with all classes, a burning question and of paramount importance.

God, who gives us, day by day, our daily bread, does not leave us without food for the intellect. He has given us, through Copernicus, Newton, Kepler, and others, an insight into the wonders of his creation, which should spur us on to continued contemplation and study, and for that purpose he has bestowed on us the telescope and the microscope; for each discovery, too, makes its appearance "in the fullness of time." He has thus opened to the mentally weary a new field of activity, and there can be no doubt that the work appointed for our age lies in the investigation of the secrets of nature, in the application of her forces—truly a grand, glorious, and elevating task for the human mind.

If ancient nations excelled us in some things, the Egyptians in administration, the Greeks in art, the later Romans, as well as Assyrians and Persians, in luxury, even the people in the Middle Ages in their interest for philosophy and religion, we surpass them all in our knowledge of nature. This is proved by the mere mentions of such names as chemistry, geology, geognosy, micrography, etc., which were unknown to former ages, though the ancients were by no means ignorant of science, as some suppose; and the names of Hippocrates, Archimedes, Aristotle, Aristarchus of Samos, Hipparchus, Vitruvius, Euclid, etc., will always be held in honor. Nevertheless, the great progress in this field is due to Copernicus, Newton, Kepler, Linnæus, Herschel, Cuvier, Laplace, Arago, Fulton, Humboldt, Franklin, Kirchhoff, Bunsen, Liebig, Tyndall, Faraday, Morse, Helmholtz, Pasteur, Edison, and others too numerous to mention.

* * *

There is a very simple means of testing the progress which a nation has made in natural science. We need only ascertain its standard of measurement. The ancients, like the savages of to-day, used the length of the hand, foot, arm, or step, a variable measurement, which makes each individual his own standard. Till a century ago the man of science was content to regard the very indefinite "line" as the tenth part of the equally inexact "inch" (thumb-breadth; Fr. *pouce*). Then there arose, principally in consequence of the advance of astronomy—a science founded upon exact measure-

ment—the necessity for a fixed measure; and the meter, the forty-millionth part of the earth's circumference, was taken as the standard. The scientist uses the millimeter (one thousandth of a meter); but even this is too large for the micrographer, who makes use of the micron, the thousandth part of a millimeter. Soon, however, it is possible, the micron may cease to be small enough; for we have already micrometers which measure the ten-thousandth part of a millimeter very exactly. The blood-corpuscles, which were formerly invisible, are, for us, bodies whose variations of diameter and thickness are measurable. And yet the size of such a corpuscle is only one hundred and twenty-five thousand billionth of a cubic meter! And what of the bacilli, of which two or three hundred millions are contained in a cubic millimeter, and of which we can breed and cultivate the various species as if they were so many sheep? So far have we sounded the depths of the infinitely small.

Then as to space. A second on the astronomical meridian—and astronomers reckon with tenths of a second—equals the twentieth part of the thickness of a hair; and yet such a second, observed as the parallax of a star, shows that this star is distant from us four billion two hundred million miles; and this is again employed as unit in measuring the distance and diameter of the *nebulæ*.

Some savants propose to take as absolute and invariable measure the length of the undulation of the yellow ray of sodium=.0000590 millimeter. We already measure by means of light the enormous distances of the heavenly bodies. We should then literally take

the ray of light as the standard, measuring therewith the immensity of the universe and the microbe. Truly, the wonders of creation surpass the boldest fancies of the poet. God has revealed to us a poetry of nature grander and truer than that of antiquity, and calculated, if we understand it aright, to raise us to him, its Author; for it is a mistake to suppose that our age is less rich in the poetry of existence than any other. It is probable that the quantity of the poetic faculty in the world remains constantly about the same, and the contrary impression with regard to former ages is due merely to an illusion of perspective. We admire from afar the blue summit of a mountain which, on close inspection, is found to consist of sand and earth, like the ground at our feet. It is the same with antiquity. The beautiful, the great, the heroic, has survived because it was worthy; while all that was paltry and prosaic has perished. The old Egyptians and Babylonians were as clever and poetical as we are, but every whit as uninteresting and prosaic too. The world-conquering Roman was often mean and petty; the wise Cato himself was an old miser, greedy of gain, and pitiless towards his slaves; and Cæsar, while crossing the Alps, instead of being lost in admiration of beauties entirely new to him, employed his time more profitably, as he thought, in writing a treatise on grammar.

Our age has its grandeur and its poetry for him who has eyes to see and an understanding heart. The St. Gothard express, drawn by a flame-breathing colossus, fed on coal and water, boring its way into the granite heart of the mountain, winding up and down, then rushing out panting and shrieking to pursue its swift

career through mountain gorges and over precipices, till it stops within sight of the blue waters of the Mediterranean, is a soul-stirring, beautiful, and poetical phenomenon. So, too, are the great liners, the 'greyhounds of the ocean—huge, moving palaces, animated by engines of fifteen to eighteen thousand horsepower, carrying hundreds of passengers through storm and waves, icebergs and fogs, in five to six days from the Old World to the New.

What a wonderful sight is a modern ironclad, this behemoth, with its thick hide of steel, breathing out smoke and steam, emitting from its eyes electric rays, speaking with the cannon's voice of thunder, wounding mortally with its sharp spur, and bearing in its heart the great engine which gives it strength and life! Cold and lifeless, motionless and dumb, lies the monster, awaiting the breath of life. The word of command sounds, a movement of the lever, and life and strength enter the dead body. Groaning and moaning, at first slowly and with difficulty, then more and more quickly the pistons move backwards and forwards, like fettered monsters turning the colossal wheels. Soon they appear to be pursuing one another like mad. Every part is alive, pushing, pulling, turning. If ten thousand men attempted to stop the machinery, their arms would be as straw. It would tear them off or crush them. But the man on the platform moves the lever once more, the motion becomes slower, soon it stops altogether. The soul has fled, and the dead body lies motionless again. It may be thus when God speaks a word of creation in the universe. Glowing suns fly and dance in space, planets whirl round them, comets

describe their eccentric paths among them. Everywhere there is life, and the music of the spheres resounds through the infinities of space. When it is enough, God utters another word, and all life is extinguished, everything stands still, motionless, lifeless, perhaps through countless æons.

* * *

But to return to our modern view of nature and the world. While the older naturalists—such as Buffon, Linnæus, Jussieu, Lamarck, etc.—concerned themselves more with the various organisms, comparing them and endeavoring to classify them, modern science inquires into the general conditions of existence common to all beings. The question of greatest interest is in regard to matter—what it is—a question which puzzled Plato, who said: “The nature of matter is very difficult to understand. The nearer one gets to it, the more incomprehensible and mysterious it appears.” Newton taught its indestructibility, and attributed all phenomena to the attraction and repulsion of atoms. Dubois-Reymond writes, “To understand nature, or, more correctly speaking, natural science, is to refer all changes in the material world to the movement of atoms effected by central forces, or to the resolution of natural processes into the mechanism of atoms.”

* * *

Let us examine more nearly these mysterious particles of matter together with the forces inherent in them or acting upon them. “Our modern science,”

says Buckner, "rests upon the law of the conservation of energy as well as on the principle of the conservation of matter;" in other words, we must refer all material changes effected in nature neither to re-creation nor annihilation, but simply to transformation of the elements.

Matter and force are, then, what make up creation. Science, however, has no certain knowledge of the nature of either. It is not even known whether one can exist independently of the other. For all practical purposes matter without force does not exist, as far as we are concerned. Its essence we can neither feel, see, hear, nor perceive in any way; it is only apparent to our senses through the forces which act in or on it. Thus matter has weight because it exercises the power of attraction. We see it because the atoms and molecules of which it is composed, being continually in motion, refract, absorb, or reflect the rays of light. We hear it because its particles are in a state of constant vibration, and they communicate this motion to other atoms, thus producing sound. Weight, color, sound, all physical phenomena, are simply transformations of motion, as physics and chemistry teach. The smallest drop of water which evaporates, the smallest particle of iron, which rusts incessantly, is not, rightly and scientifically considered, a dead particle of a dead substance. It is a microcosm of billions of atoms whirling round one another with the greatest rapidity, combining with the surrounding matter to produce new forms, displaying a most extraordinary vitality.

How have we arrived at this conception of single atoms which no one has ever seen or ever will see?

Simply by recognizing that it affords the only possible explanation of the fundamental fact of chemistry, that atoms will not combine in any proportion, but only according to an invariable law. Thus eight parts of oxygen will only combine with one part of hydrogen, or sixteen of oxygen with two of hydrogen, and so on; but not one and a half of oxygen with five or seven and three-quarters of hydrogen. Eight parts of oxygen is, therefore, the equivalent of one part of hydrogen. And so it is with all elements.

It is interesting that these atoms, in entering on a combination, display very marked predilections. Those which bear the greatest resemblance to one another, and belong, in a certain sense, to the same family, like the metals, show no affinity for one another; and if they do combine, the product of their union, according to Liebig, possesses the faults and virtues of the family highly intensified; while the combination of two atoms of opposite nature, but having a great affinity for one another, produces an entirely different body, bearing no trace of its parentage. Thus in the chemical world also there exists the attraction of opposites; and it is one of the mysteries of creation that an atom of iron will rather unite with an atom of oxygen than with an atom of gold or silver.

As regards the number of these elements—that is, those bodies which chemistry has so far not been able to decompose—Mendeljeff and Lothar Mayer discovered that they can be arranged in groups of seven, corresponding to octaves in sound, and that the *do, re, mi*, of one octave or group show a distinct resemblance in properties, weight, etc., to those of another. Here and

there gaps occur in the series, from which it seems to follow that there exist elements yet unknown to us. A few—germanium, for example—have already been discovered by means of this theory, which is known as the law of octaves.

According to Mendeljeff, then, there are a hundred elements—two groups of seven and five groups of seventeen each, and hydrogen. Of these, sixty-three are known up to the present time.

The elements with which we are acquainted may be divided, according to their practical value, into three groups. The first group contains eighteen. These are the bodies most widely diffused on the surface of the earth, and also those which are most indispensable to life. But why does this mysterious thing, which we call life, require these mysterious unities of matter for its manifestation and preservation, and why these in particular? We do not know? They are aluminium, bromine, calcium, chlorine, iron, fluorine, iodine, potassium, carbon, magnesium, manganese, sodium, phosphorus, oxygen, sulphur, silicon, nitrogen, hydrogen—by no means those with which we are most familiar.

The second group comprises twenty-three elements. They are not so generally distributed as those in the first group, and are not, so far as we know, indispensable to life. They constitute the luxury, the ornaments, of nature, if she recognizes such. Strange to say, the best-known metals are contained in this group: gold, silver, lead, copper, nickel, platinum, mercury, zinc, tin, etc.

In the third group are twenty-two very rare elements. We do not yet know what part they play in

the economy of nature, nor whether their absence would make any difference to us. It is possible, however, that they might be sorely missed. Lithium, tellurium, indium, zirconium, are some of the names by which they are known.

A chemist who is very familiar with these elements writes of them thus: "We have here a highly respectable and interesting gathering. There are aristocrats and democrats among them, natures phlegmatic and sanguine, arrogant and modest, brilliant and insignificant. Some are nervous and irritable, flying into a passion on the slightest provocation. Some have very pronounced characteristics; others are without any. They are energetic or idle, selfish or vain, hard or soft, reserved or sympathetic, ethereal or corpulent, kings or vassals, mediators or stirrers-up of strife; in short, they display characters of every variety." (G. Buchner. *Die chemischen Elemente*.)

In spite of their sociability, these units of matter possess an absolutely indestructible individuality. An atom of sulphur may be burned, may be given off in the form of gas, as S O_2 ; may assume a liquid form, as in S O_3 ; may combine with iron to produce hard, yellow crystals, iron pyrites (Fe S_2) without changing its nature or losing its properties in the slightest degree. Let it be released from its combinations, and it returns to its original state, with the same power of attraction, the same affinity, the same specific gravity—indestructible, immortal, an absolute vitality. All our machinery, all the forces of nature, are powerless in face of this tiny unity of creation. The heaviest steam hammer can not crush it, the strongest hydraulic pressure has no effect

on it. Man and all things living may disappear from the earth, the sun and all the heavenly bodies be dissolved; but an atom of hydrogen remains an atom of hydrogen through all, only to be changed or annihilated by a word from God. And yet men talk of dead matter!

Of what size and shape are, then, these atoms and particles of bodies? The question is not easy to answer. The simplest hypothesis seems to be that which assumes that the form of an atom of any element is identical with that in which it crystallizes. As to their size, Gaudin concludes from microscopical observations that the distance of the atoms from one another is not greater than the ten-millionth of a millimeter, so that a man would require 250,000 years to count those contained in the head of a pin.

Lord Kelvin concludes from observations of the light waves, capillary attraction, and the movement of gaseous molecules, that the diameter of a molecule varies between one-millionth and one-hundred-millionth of a millimeter. Lothar Mayer calculates that a quarter of a quadrillion (one million billions) of hydrogen atoms weighs about a gram. It is true that these are only approximations, but at least they do not contradict one another, and science must begin with approximations in order to arrive, by degrees, at certain data.

That matter is not continuous, but discontinuous, is also proved by the fact that the same elements, combined in the same proportion, will produce bodies possessing different qualities—*e. g.*, vinegar and the ill-smelling butyric acid—a fact which is owing to their elementary constituents being differently arranged,

grouped, or built up. On the other hand, frequently the same body displays different physical properties, probably for the same reason; another specific gravity, another crystal form. For example, this is seen in the case of carbon, which occurs as diamond, as black lead, as coal; of phosphorus, which is at one time yellow and crystalline, at another red and amorphous. Thus not only the quantity, but the form and arrangement of the atoms has an influence upon the outward appearance, and also upon the properties, of the body.

But as the atom does not satisfy the requirements of science, the molecule has been invented. By this term was formerly meant a combination of two or more atoms of different substances, such as a molecule of water composed of one atom of hydrogen and eight of oxygen. Now, however, we have hydrogen and oxygen molecules, aggregations of atoms of the same substance. How have we been led to this conclusion? for that no one has ever seen a molecule is a certainty. By observing that, as a rule, the elements exist, so to speak, in a fettered condition. For example, were all the atoms of oxygen free, they would consume us like a devouring fire. Fire is, in fact, nothing but the rapacity, the fury with which oxygen atoms precipitate themselves upon other atoms. In order to explain their customary inactivity, we assume that they are chained to one another, and neutralize each other's efforts, like two galley-slaves fettered together, each anxious to fall upon a different prey, and dancing round one another in powerless rage. But when their rapacity is increased to the highest degree by heat, electricity, or the presence of other energetic elements, these atoms burst

their bonds, fall upon other substances, and form composite molecules.

These atoms and molecules do not touch one another. A sufficient proof of this is the fact that the hardest steel expands with heat and contracts with cold. From the action of molecular forces it has been concluded that in a cubic centimeter of air all the molecules together amount only to one-third of a cubic millimeter—that is, one three-thousandth of the whole apparent volume. According to other computations, they are still smaller. Flammarion supposes that a cubic centimeter of air contains a sextillion molecules. Looked at by the mind's eye, then, a rifle bullet is not, in reality, a hard, solid mass, but rather resembles a swarm of gnats, or—for extremes meet—one of those distant nebulæ, consisting of millions of suns whirling round each other. These molecules move round and about one another with a velocity of which we can form no idea. The speed in a hydrogen molecule reaches, at an ordinary temperature, two kilometers in a second, four times that of a cannon-ball.

The atoms in a molecule are held together and grouped by forces which attract or repel, possibly by electricity. Flammarion says: "We have no conception of the energy of these molecular forces. If we heat a kilo (about two pounds) of iron from 0° to 100° , it expands about one eight-hundredth, therefore to an imperceptible degree; and yet the force which caused this expansion would suffice to raise ten thousand pounds a height of one meter. The force of gravitation almost disappears when compared with these molecular forces. The power of attraction which the

earth exerts on the above-mentioned kilo is as nothing compared to the mutual attraction of its molecules. When one kilogram of hydrogen combines with eight of oxygen to form water, a force is exerted which would be sufficient to raise the temperature of thirty-four thousand kilograms of water one degree, or to lift fourteen million kilograms one meter. Or, to put it differently, during the formation of these nine kilograms of water the molecules plunged into an abyss, which would be in the proportion of fourteen thousand meters to one thousand kilograms of water. (*Astronomie populaire*, p. 398.)

And not the least mystery in this world of matter is that it is heat, a vibration of the ether, which is the source of life to these atoms. Professor Raoul Pictet, in his interesting experiments on cold and its effects, has proved that at a temperature of -200° the acids do not act upon metals. Their molecules have ceased to live. And yet bacilli, microbes, subjected to that temperature, practically immured in a block of frozen air, were perfectly well. At -273° , which is taken as absolute cold, the gas molecules cease to live. Knowing, then, the wonderful power of heat, this more or less rapid vibration of the ether, it has become necessary to fix a thermal unit, or calorie, which, however, is not the same in all countries. In France it is the quantity of heat necessary to raise the temperature of one kilogram of water through one degree Centigrade; in England it is the quantity necessary to raise one pound of water through one degree. (The unit of work is the foot pound; that is, the work performed in raising a weight of one pound through the height of one foot.)

It is well known that water atoms or molecules in passing from the liquid to the solid state, that is, in freezing, separate with such force that they easily burst iron bombs; but we are not by any means acquainted with all the forces which have matter for their plaything. Not long ago there was an attempt made in Vienna to measure the resistance of the hardest stone, corundum, and the hardest steel. It was to be expected that the steel, being much the softer, would yield first. A cubic centimeter of corundum crumbled under a weight of 6,000 kg. A like cube of steel, however, resisted more than seven times that amount, 43,000 kg., and instead of simply crumbling, it exploded with the noise of a cannon, sending off sparks in all directions, which even penetrated the machine. Evidently unknown forces were here at work on a hitherto unknown state of the metal. Nitrogen at an ordinary temperature resists the pressure of 2,890 atmospheres; that is, its molecules will not allow themselves to be brought so near together as to become liquid, so eager are the atoms for freedom. And what would it be at a temperature like that of the sun, for heat increases the repelling power of the atoms, their striving for liberty.

Professor Dewar succeeded in producing several liters of liquid air by enormous pressure. Unfortunately we shall never know how this drink tastes, as it has a temperature of -200° , and would have the effect of molten lead upon palate and stomach. Professor Pictet had a burn caused by a drop of it which took six weeks to heal. And in what consists the force of gunpowder, melinite, dynamite, and the still more terrible nitroglycerine? Simply in the fact that here atoms have been

forced into a union abhorrent to them, and not having of themselves the power to dissolve the union they slumber fettered and sullen; but rouse them by even a spark, and they burst their bonds, destroying everything around them in their victorious attempt to procure sufficient room for their individual existence.

All earthly substances are really such more or less ill-assorted unions, forced and temporary connections. A little more heat, $10,000^{\circ}$ or so, a mere trifle compared to the heat of the sun, would suffice to resolve these complex substances into their component parts with great explosion, and also to change the apparently passive materials, stones, etc., into another state of being, in which their now idle and lifeless atoms would move with power and freedom. The idea of the great mystic, Jacob Boehme, according to which Creation, divine matter, was laid in bonds by Lucifer at his fall, is wonderfully borne out by the newest chemical and astronomical views, as is also the prophecy of St. Peter that "the heavens shall pass away with a great noise, and the elements shall melt with fervent heat." (2 Peter iii, 10.)

The further and the deeper we seek to penetrate into the essence of matter, the more we are confronted by mysteries. If we are to regard an atom, a unit, as an absolute individuality, it is difficult to see how one such can differ from another in quality, since the very idea of quality is based upon a combination of different things. Again, it is incomprehensible why such an individuality, which undoubtedly forms a complete whole, and ought therefore to be self-sufficient, should feel irresistibly drawn to another strange and unknown whole,

or why the mutual attraction is stronger in those atoms which are most unlike, and sometimes increases even to fury. It is also beyond our comprehension that the union of two entirely different atoms produces an individual which differs both in appearance and properties from the parent atoms. The chemist, though going to the root of things, though near to the source of all phenomena, is obliged to confess of matter, as the ancient sage did when asked by the king what God was, "The longer I think over it, the less I understand it," and must content himself with studying the wonderful and inexplicable forces inseparable from matter, and the laws by which they are manifested.

The terrible forces which agitate the atoms in the smallest bodies are the same that drive the heavenly bodies in space. First of all, gravitation; then heat, light, electricity, all different phases of one and the same power; for they are at all times interchangeable. When we burn coal we obtain a chemical combination of carbon and oxygen; that produces heat, which is converted by the steam-engine into motion; and that this can be changed into light we see daily; this light in its turn produces (*e. g.*, in photography) chemical combinations, and thus the circle is complete, and in so far we can say: One force moves the suns, those atoms of the universe; and the atoms, those suns and force-centers of matter. As we know exactly how much motion gives a certain amount of heat, or how much heat produces a certain chemical combination, we can literally store up force, or forces, keep rays of sunlight and use them a hundred miles distant or ten years hence as motion, chemical force, heat, light, or electricity, according as we wish.

This unity and constancy of all force and matter is the greatest and most useful discovery of the nineteenth century, as that of the law of gravitation with its incalculable results to science was of the eighteenth. All impressions which we receive through the senses are but the perception of molecular movements. Feeling, hearing, and sight are consequently identical, differing only in degree. Let us suppose ourselves shut up in a dark room touching a bar of steel which vibrates ten to twenty times in a second, the finger would feel the vibration; let it vibrate 64 to 23,000 times in a second, and we should hear a sound rising gradually in pitch; were the vibration still more rapid we should feel warmth, increasing to great heat; let the number of vibrations in a second be increased to four hundred billions, and the eye would see a red glimmer, which, with greater velocity of the molecules, would get lighter and lighter, passing through all shades of color till it reached the incandescent white light which unites all colors in itself. We might, therefore, say with equal truth, the ear sees the sound and the eye hears the light, and we can conceive the possibility of a being possessing one single organ of sense, which perceives this series of molecular motions as an increased intensity of one and the same sensation, or as different shades of one color.

By conservation of force is understood the natural law that no force, not the smallest conceivable amount of force, is ever lost; it is only transformed. For example, the shell weighing five hundredweight which strikes the plate of an ironclad suddenly loses its motion; but in place of that there arises in both a degree of heat which would produce exactly the former rate of motion, and

the former shock; or else a chemical change which would do the same, and so on to all eternity.

This visible and tangible matter swims, however, in a boundless and fathomless ocean, consisting of a subtile, imponderable, and highly-elastic fluid, which has from ancient times been named the ether; the Hindoos, the Egyptians, the Greeks, believed that the heavenly bodies were formed of it. Ovid says in his "Metamorphoses" (i, 67): "Above the earth with its atmosphere God spread out the clear, weightless ether, which has in it nought of the dregs of earth." This idea we meet with also in Plato, Spinoza, and other philosophers. Secchi has introduced to science the ether (assumed already by Euler and Huyghens) as a fluid distributed through the entire universe, in which all the heavenly bodies swim, by which they are driven onward in their orbits; and now some physicists believe that each atom and molecule of matter is surrounded by an atmosphere of condensed ether (dynamide), which emits force. We can form no conception of the extreme rarity of this ether. Babinet calculates that the substance of which comets are formed is 140,000 million times lighter than our air, and for this reason he calls them "*des riens visibles*;" but with regard to the ether, some scientists speak of it in virtue of various calculations as a substance six hundred billion times lighter than any known on earth. Compared, therefore, with the ether, our air is many million times heavier than gold is in comparison with air. It must be so, otherwise (in consequence of the resistance of this ether) a perpetual hurricane would blow everything on earth off into space, and the surface of our planet would be a chaos.

* * *

Now that we have considered the substances met with on the earth, their combinations and the forces by which they are moved, and have arrived at the knowledge of the indestructibility of matter and the conservation of energy, the interesting question presents itself: Is the matter with which we on earth are acquainted, the same as that which forms the innumerable celestial bodies? Is it there subject to the same laws and animated by the same forces? A hundred years ago there did not seem to be much hope of the question ever being answered; and even Newton, who was able to prove that the law of gravitation holds good for all heavenly bodies, would probably have smiled at the idea of its being possible to find out whether salt or mercury existed on a particular star. Who would have believed that each ray of light for thousands of years has contained certain information on this point? Who knows what knowledge still lies hidden in a ray of light?

Fraunhofer discovered in a ray of light, decomposed and split up into its seven principal colors, numerous fine and thick, black and colored lines, the number of which soon grew to hundreds and now amounts to thousands. Kirchhoff and Bunsen found (1859) that these lines have their origin in the chemical components of the burning or shining substance, and that each element produces particular invariable lines, always appearing in the same place in the spectrum; sodium, for example, a light, broad, yellow line; thallium, a blue; rubidium, three green lines, etc. Hence has arisen a method of analysis, known as the spectrum analysis.

We can thus read distinctly in the smallest ray of light which twinkles from the farthest fixed star, if oxy-

gen, or gold, or iron; in short, any element is found there; if so, whether as gas or liquid, hot or cold! Surely one of the most wonderful facts in nature! One can easily imagine with what interest and eagerness astronomers set to work to discover whether the elements we know are common to the universe, or whether others unknown to us exist elsewhere. The answer was surprising. The substances which form our air, our water, our stones and plants, our blood and bones, are diffused throughout the universe, and are everywhere the same. A grand and important fact is this identity of matter—an invisible bond of union for all the heavenly bodies.

How voluminous and far-reaching this book of light is may be seen in the fact that Norman Lockyer, the celebrated spectroscopist, has been working for years at an illustration of the solar spectrum on a large scale, which is to show, if possible, all the Fraunhofer lines. The picture when finished will be over a hundred yards long; and he required to take above one hundred thousand observations and about two thousand photographs of the spectra of the different elements. How exact the indications are, is shown by the following: Swan found that spectrum analysis indicates the presence of the two-millionth part of a gram of sodium! Lang detected the fifty-millionth of a gram of thallium! Kirchhoff and Bunsen showed by careful experiments that the three-thousand-millionth of a gram of sodium burning in a flame can be clearly recognized by the spectroscope—a quantity which the eye could not detect with the best microscope—which does not affect the sense of smell or taste, which no organ of sense and no instrument of man's invention is able to discern! There

is something truly awful in this unerring language of light which reveals things otherwise hidden from man. Lockyer found, besides, that spectrum analysis is of great service to quantitative analysis; in a compound of gold and copper the relative quantity of both metals was ascertained within 1/1000. Again, Brookes decomposed by means of spectrum analysis the supposed element, yttrium.

We are becoming more and more expert at interpreting the language of light. Not only does it describe to us the chemical constituents of distant planets; not only does it tell us whether a sun one thousand millions of miles away is approaching or going from us, and at what speed it is moving; but the periodic doubling of certain lines tells whether what appears to the strongest telescope as a mere dot of light is a single sun, or consists of two or more gigantic bodies revolving round one another. A case in point is the double star, Mizar, the middle star in the axle of Charles's Wain, which has a revolution of one hundred and five days, and is equal in mass to five hundred and ten millions of earths like ours.

And what a horizon is opened out to us by the amazing discovery of Professor Röntgen of rays to which opaque substances, paper, wood, leather, are as transparent as glass. And yet even this is not absolutely new! Aristides, the friend of Marcus Aurelius, relates in his "Sacred Discourses" that he had seen his internal organs. Hippocrates and certain Egyptian priests speak of a similar power of vision which was possessed by some somnambulists; and an intimate friend of the author, a captain in the German army, frequently when in society,

or at a concert, saw for the moment all those present as skeletons—a most disagreeable experience. Here was evidently something analogous to Röntgen's discovery, though it was regarded as a hallucination.

It is impossible to overestimate the importance of the establishment of the identity of matter in the universe. As not so very many centuries ago even the learned believed unexplored countries to be inhabited by human monsters with one eye, or horns, or ears hanging to the ground, as described in Mandeville's "*Livre des Merveilles*," similarly a hundred years ago it was thought possible that in space there existed unknown and mysterious substances, conditions, forces, and phenomena analogous to nothing on earth. As we have now recognized the fact that on earth all types vary only within very narrow limits, we see more and more that in the whole of creation a logical and reasonable, though rich and varied, development of a few fundamental types is the rule. While man seeks to attain variety by extravagant fancies, God produces by the simplest means a marvelous richness and variety of forms. Thus by simply varying the length and the inclination of three axes the whole world of crystals is produced! Thus the hundreds of thousands of different plants are built up from the simple cell. So, too, the millions of suns, planets, comets, in space consist of a few elements, almost all of which are found on the earth, subject to the same laws there as here. The double stars circling round each other describe the same mathematical curves as the stone thrown up by a child; there, as here, hydrogen and oxygen combine to form water, which there, too, freezes or evaporates according to the

temperature. There, as here, iron rusts in the presence of oxygen, and forms oxide of iron; there, too, color is produced by the vibrations of the ether, and a mixture of yellow and blue gives green. Spectrum analysis tells us that copper, lead, mercury, iron, gold, salt, etc., exist there too, and the meteorites which have fallen on the earth show that throughout the universe these substances crystallize in accordance with the laws of our crystallography. In short, we know now that, as far as space and matter reach, twice two makes four, and the three angles of a triangle are together equal to two right angles; or, in other words, God has one and the same mathematics, physics, mechanics, and chemistry for all creation.

There is one more great fact which the ray of light seems to be about to disclose. The four, or according to the latest idea five, types of fixed stars show an ascending scale of temperatures from the red up to the white; but, strange to say, also a continual simplification or dissociation of the elements. In the hottest suns the line of hydrogen has gained so considerably in prominence that Lockyer questions whether it is not possible that, with a sufficient degree of heat, all our so-called elements might be resolved into this fundamental form of matter. This is a great thought. As the greatest discovery of this century is the unity and the conservation of force, the next may see the discovery of the unity of matter! Even if that fact were established, however, it would not mean the attainment of the long-sought art of the transmutation of metals, or the fabrication of gold and diamonds, as we shall probably never be able to generate the requisite amount of heat for the dissoci-

ation of metals, such as exists on the fixed stars. It is surely not in God's purpose that man should be able to free himself from those conditions of existence whose suspension would be fraught with such serious consequences to the development of humanity, the least of which would be the almost total depreciation of the precious metals and stones.

* * *

The microscope has contributed in the same way to a grand and simplified understanding of the animal and vegetable world. By its means we have discovered that the thousands upon thousands of plants of all kinds, their roots and their leaves, their flowers and fruit, are built up from one single form, the cell. This is a little bag made of a horny substance, sometimes microscopically small, sometimes several millimetres long, either with very thin walls as in the strawberry, or thick as in the peach-stone; of various colors, according as it is filled with air alone, as in the lily and all white flowers; or with fluids of different colors; or, as in grass and leaves, with a colorless juice, in which swim innumerable green granules of chlorophyll. These cells originate in the pollen as dainty, independent, ribbed, many-sided globules, forming hexagons through mutual pressure, as in the pith of the elder; or, lengthening, into cylinders, as in stems; or, by resorption of the partitions, becoming long vessels or tubes. On their surface pores are formed to facilitate the sucking in and giving out of the liquid nourishment, and these pores, too, unite and form long spiral slits; while the thickening of the partition becomes

little windows, steps, and spirals, as in ferns and balsams. The cell, nothing but the cell, is the material of which God has constructed alike the mushroom and the palm, the rose, seaweed, and moss, the potato and the grape.

The animal kingdom is as simply built up, also of millions of microscopic cells. Our hairs, and the exquisitely fine ones of the mouse and the bat, are cells, as well as our heart and brain, bones and skin, and millions of cells flow in our veins as blood-corpuscles. And as matter is composed of millions of atoms, and the heavens filled with millions of stars, our world, the air, the water, and the earth, are, the microscope teaches us, filled with millions and billions of single cells, of whose very existence humanity was for thousands of years unaware, each one a germ, an egg, a seed, a being not animal and not plant, yet gifted with extraordinary energy, causing frightful poisons, destroying millions of fish in the sea, of plants and insects on land; and men, too, fall like grass before the sickle when they make their appearance as plague, black death, cholera. Mysterious and weird beings! Such cells filled with the ten-millionth of a drop produce invisible seeds, or split up, many of them hourly, into two, four, eight, sixteen, etc., a degree of fertility otherwise unheard of. What are plants which produce thirty million descendants in the third year, or a fish with six million eggs to these monads, bacteria, microbes, bacilli, a hundred millions of which would be contained in a cubic millimeter, and which engender in twenty-four hours sixteen and one-half millions, in two days two hundred and eighty-one billions, in three days forty-seven trillions!

We find that the more we penetrate on the one hand

into the depths of earthly substances and organisms, on the other into the infinities of the universe, everywhere we find greater knowledge coincide with simplification, with a reduction to a few substances, forces, forms, not to say one substance, one force, one form. Thus creation culminates in the great One; philosophically considered an important fact.

From an extended knowledge of matter, its forces and its laws, have resulted the discoveries which astonish mankind, the steam-engine, the telegraph, the telephone, etc. These, and others which have not yet become common property, or which, though guessed at, are not yet discovered, will during the next hundred years give an entirely different aspect to the world and the outward life of the individual.

Our improved physical science has enabled us to construct wonderful machines like the phonograph, the photophone (which reproduces at a great distance by reflection words spoken into a flame), telephone, microphone, and megaphone (invented by Edison, by means of which one can converse at a distance of three kilometers). These apparatus react instructively upon our knowledge, and teach us how nearly connected are sound, light, and electricity; how unlimited their effects; how they act far beyond the cognizance of our senses; how sounds can be mechanically produced and fixed by undulatory lines, so that in future times grandchildren will be able to hear, as often as they like, the voice of their long-dead grandfather. Munchausen's horn, with its frozen tones, has become a marvelous reality!

It is a remarkable fact, and one full of importance to the unprejudiced thinker, that modern scientific thought

draws ever nearer to the mystic. That our softly-spoken word resounds through space, and, having gone all round the globe, returns to us; that the air is an immense phonograph; that all life on earth is the product of the effluvia of the stars, and especially of the sun; that the ether which fills all space is the source of all force; that force is light, and light is force; that all the elements are derivatives of one pure element; that there is a ray of light, and consequently a vision, which pierces opaque bodies; that fire reveals the innermost nature of all things; that number and numerical relations lie at the root of all the properties of matter,—are truths at the recognition of which science has been gradually arriving; though when enunciated by mystic philosophers, Jacob Boehme in particular, they were treated as absurdities, and those who propounded them considered as hardly of sound mind.

Let us consider the practical result to our civilization of this simplified view of nature and natural laws. It is manifested often most clearly where we least suspect it; for instance, in our use of paper and iron. Where should we be in this nineteenth century without them? Paper has always been highly venerated in China, the country of its origin, as the thought-bearing material, the essential substance. It made its way very slowly to the rest of the world. It reached Samarcand in A. D. 650, Bagdad in the year 800, Cairo in 1100, and not till 1340 was the first paper manufactory founded in France. And only in this century have we begun to imitate the Chinese in making it of wood, straw, and grass, from trees, such as pines, willows, and poplars. It is not quite evident why we make so much more use of paper than our

ancestors. It is not that we think more; but that we think not for ourselves, but with and for others. Instead of communicating our thoughts and impressions in the rare but long letters of our forefathers, we scatter them broadcast on post-cards. We arrive at Naples—make an excursion to Capri. We must send a post-card home. “Just seen the blue grotto; perfectly wonderful! Pure cobalt and ultramarine. Boat-hire a regular swindle; five *lire* an hour! Addio! More to-morrow from Vesuvius.” In this way impressions evaporate, the memory fades, and the intended letter is never written. Letter-writing as it was in the last century is a lost art, elbowed out of the way by post-cards and letter-cards. It is the same with books. “*On ne lit plus les livres*,” is the complaint of Parisian booksellers. The light novel, magazines of all kinds, and, above all, the newspaper, are taking the place of books; people acquire a superficial knowledge of all subjects from epitomes, abridged editions, and newspaper articles and criticisms, a more than doubtful advantage. In the coming century, no doubt, paper will play a still more important part. The Americans make of it wheels, casks, vases, and racing-boats; the dome of Greenwich Observatory and that of the Palais de Justice at Brussels are solidly and lightly built of papier-maché, and the Corporation of London has recommended its employment for public buildings.

In iron, or, rather, steel, which can be produced quite as cheaply, we have the necessary backbone and counterpoise to paper. We live in an iron age. A knight of old protected himself from hostile spears with sixty pounds of iron. To-day we protect ships and towers with millions of pounds of steel, with plates

half a yard thick, each weighing about sixty thousand pounds, and costing about £3,000, against five hundred-pound shells from cannon weighing eighty thousand pounds. Besides this we encircle the earth with a network of iron wires and steel rails, on which, day and night, run thousands of iron horses, while huge leviathans of steel swim through the waters of the ocean.

In all ages the combat with fire and metal has had great attractions for mankind. The smith has always been regarded in the light of a hero, the first, Tubal-Cain, being worshiped as a god by the Romans. But what were the forges of olden times to the furnaces of Armstrong or Krupp, or their sledges to the giant steam-hammers weighing over nine hundred tons, which shake the earth for three miles round, at whose blows houses totter; to the hydraulic presses, with a pressure of four thousand tons, which compress, bend, or cut like dough iron plates twenty feet long and a foot thick? Enormous cranes, worked by electricity, move backwards and forwards, lifting and carrying cast-iron and steel blocks two hundred and fifty tons in weight; and at the same time these iron works, with their colossal machinery, are capable of turning out the finest work. The enormous steam-hammers could easily crack a hazelnut without damaging the kernel. Huge bars of steel are fixed upon lathes, to be turned perfectly smooth, and centered by means of the Palmer wheel to within one-hundredth of a millimeter.

While in the last century a furnace twelve feet high yielded two to three thousand pounds a day, one seventy-five feet high, and broad in proportion, at the present day yields more than two thousand hundred-

weight. Every hour its iron throat swallows about two hundred and seventy hundredweight of ore and coke, and gives out every two hours two hundred hundredweight of liquid metal; and that goes on unceasingly, day and night, Sundays and holidays, for the furnace must not be allowed to go out during the whole term of its life, which is about fifteen years. Then it is extinguished and broken up. Large iron works possess seven to nine of these furnaces, producing daily nearly fourteen hundred tons of metal.

And yet all these substances—iron and steel, copper, zinc, aluminium, the offspring of one unknown parent, perhaps of the mysterious ethereal hydrogen, perhaps of the passionate, insatiable oxygen (for Professor Dewar says that solid oxygen is subject to magnetic attraction)—are agents, media of force. Iron and steel, metals altogether, are the tough and yet flexible, malleable and elastic forms of matter which are best adapted to be the instruments of force and forces; and for this reason, were there no metals, there would be no civilization—a fact which the son of Lamech foresaw by intuition when he compelled brass and iron, by the power of fire, to come out of their earthly wrapping, and become to man the instruments of force.

Force! That is what we stand in need of. We can not have too much of it. We have discovered how tractable and serviceable this force is which shines as light, glows as heat, flashes in the lightning; in the sunbeam warms the earth, makes vegetation to grow, and ripens the fruit; which sounds in the organ and vibrates in the fiddle-string; which now rushes in the waterfall, now, invisible, in giant cylinders drives the

ship's screw, now slumbers in gunpower and dynamite till, when roused by a spark or the slightest concussion, it deals destruction to all around. Every town, every village, desires to possess as much as possible of this force to light its streets, to warm its houses, to plow its fields, mow and thresh its corn; for in this century horse and ox are altogether too slow for us. We require beasts of draught and burden of steel, animated by lightning, without wills or wants, which neither become ill nor infirm, and which, when worn out, can be thrown back into the furnace.

The steam-engine did as a stepping-stone from the picturesque moss-covered water-wheel; but it may soon be thrown away as old iron, and the smoky, noisy, sooty locomotive too. Why bring coal from great distances at enormous expense to transform it into force, with considerable waste in smoke and ashes? The world is full of force. Wherever a brooklet rushes, a river flows; wherever the wind whistles over desolate heath or round mountain-peak; where the sea surges in ebb and flow,—there is force. And it is possible to grasp it and change it into electricity, the cleanest (smoke and soot are not only unpleasant waste, but also a loss of force) and most unmaterial of all forces, not the least advantage of which is that it can be, at will, transported, conducted, and stored in accumulators. In the near future the Falls of the Rhine will aid a shoemaker in Basle to sole his shoes, a farmer at Constance to plow his fields, and a student at Zurich to light and heat his study.

In former ages a force was local, and man was obliged to go to its source. These forces are compar-

able to the heavy iron money of the Spartans. With coal and steam the gold coinage of force came into circulation. Electricity represents its notes and cheques.

The present century will be the era of electricity. We can easily foresee what great services it will render to man in the future. Firstly, as the most convenient source of light and heat. One can, according to Professor Häussermann, generate by its means a heat of three thousand degrees, while the flame of hydrogen does not exceed eighteen hundred degrees. This degree of heat, which melts quartz, will serve to produce the carbides, carborandum (a substance almost as hard as the diamond), and calcium-carbide, an all-important factor in the production of alcohol from inorganic matter. Its most astonishing application will, however, be in electrolysis (discovered by Davy in 1807), the separation of elements by the electric current into negative and positive, which lays the foundation of an electrical chemistry. One result of electrolysis already attained is electro-metallurgy, the art of coating with precious metal in the electric bath a body of any shape, so that the nucleus can be drawn out and the hollow form remains. Still more important is the chemical separation by its means, as in the separation of aluminium from clay. The electric current is employed, too, in the rapid bleaching of wool, linen, wax, and paper; in the purification, by decomposition, of the contents of the sewers of our towns; in the tanning of leather, the ripening of fruit, the giving an old bouquet to new wine, even the artificial aging of wood for the manufacture of valuable violins. It will no doubt find its most important use in the decomposition of water

into hydrogen and oxygen, and so cheaply that this decomposed water will become the fuel of the future. Here is a simple and inexhaustible substitute for coal, which we know must sooner or later be exhausted.

It will also serve as gunpowder. The hardest rocks have already been blasted in Germany with cartridges twenty centimeters long, filled with water, which the electric current decomposed in forty hours into hydrogen and oxygen. This is then ignited by the electric spark. It is easy to foresee that this mysterious agent will, in the future, be applied to all kinds of domestic labor—it will, in fact, become our maid-of-all-work—and no doubt men will invent all sorts of uses for it, ingenious and absurd. It is not impossible that the traveler of the future will carry a store of it in his knapsack to aid him in crossing a river or climbing a mountain.

Electricity, then, will quicken the pace at which we live, and play so indispensable a part that our grandchildren will wonder how ever their forefathers managed to exist without it.

And yet all these forces—water and steam, heat and electricity—are only derivatives, products, of the heat of the sun, the only source of energy to us. Every square meter on which the sun shines receives numerous calories. (The quantity of heat necessary to raise the temperature of a kilo of water one degree, and which, transformed into force, would raise four hundred and twenty-five kilos—about eight hundred and fifty pounds—one meter in a second, is, as we have already seen, called a calorie.) As far as we know, all those which fall on the sandy deserts of the earth, on the roofs of

our towns, are so much loss of heat. If we understood the art—and we shall learn it—of turning to account all these millions of calories, we could literally heat our houses in winter with the superfluous heat of summer, which would mean, too, a lowering of the summer temperature. A very small proportion of the heat of Egypt would be sufficient to work all the railways and ships in the Nile Valley. If we should one day find it possible to water the Sahara and the Soudan by means of solar pumps, we should only be doing in little what the sun does every day on a large scale, since it draws daily from the Dead Sea alone four million tons of water to a height of several thousand meters, whence it falls again to water the earth; for the bright beams with which the sun warms and enlightens us, ripens the corn and the fruit, and paints the flowers, are rays of force. The quantity of the sun-force which our little earth receives in a year—a tiny fraction of that which is diffused continually through space—amounts to over two hundred and seventeen millions of millions horse-power. These rays, in their action on vegetation alone, produce effects millions of times greater than all our machines. It will be the dream of future engineers to draw direct from this source of all force; and, for example, to convert isolation into electricity for the driving of electric trains in the Sahara, etc. We shall undoubtedly come back by degrees to this center of energy, with the result that the tide of human life will flow slowly back to the sunny lands, whose inhabitants—Egyptians, Assyrians, Carthaginians—were once the leaders of mankind.

The germs of the future lie in the present. Let us consider the probable logical evolution of these germs—without reference to Biblical prophecy on the one hand, or social problems, their influence and solution, on the other—and draw an imaginary but not impossible picture of the material development of the world in the coming century.

In the first place, internal and international communication and traffic will attain dimensions undreamed of. World-lines will be laid, with a gauge of ten meters, and double or triple rails to obviate accidents, from London to Peking, from Petersburg to Cape Town, etc. On these will run, at a speed of one hundred to one hundred and fifty miles an hour, electric trains, consisting of single palatial carriages, like great hotels, fitted with every comfort and convenience. To these will be attached the traveling villa of the future, built of aluminium, bronze, ixium, or papier-maché, the walls filled with celluloid to exclude heat and cold, luxuriously furnished, lighted and heated by electricity, with a garden on the roof, in which the private gentleman, the engineer, and the commercial traveler will be able to transport himself, with wife and family, to any spot on the globe.

Side by side with these lines, others, more massive, will carry the commerce of the world in enormous store-wagons and reservoirs with a capacity of a thousand cubic yards, containing corn, oil, wine, petroleum, etc., while commodities such as timber, ore, granite, and other kinds of stone, will be conveyed in the cheapest way, by the regular winds.

On the ocean, as well as on land, definite routes

will be established—for example, between Bordeaux and Panama, London and the Cape, Liverpool and New York—illuminated by floating lighthouses of steel firmly anchored, showing the great liners the way they must take by a white light on one side and red on the other; while the smaller vessels will be obliged to keep to the sides of the route, thus avoiding collisions. These lighthouses will serve at the same time as storehouses, telegraph and news offices, and salvage stations. Besides floating palaces and giant storeships for the transport of passengers and goods, the oceans will be dotted with the yachts of private individuals, seeking, on the sea, rest and recreation for their overwrought nerves. This yacht of the future, as described by the author in the paper “Le Yacht” (1884) will resemble a water-beetle, now dancing lightly on the surface, then, at the approach of a storm, or in order to explore the wonders of the deep, drawing in sails and masts, and sinking, watertight, to the bottom, where it will crawl on its way. By means of dynamos it will be able to climb on land, and, adapting itself to the railway lines, will be carried, by wind or electricity, over continents, to take part in races on the ice-runs at the North or South Pole. How far advanced we are already from the state of things in England in 1669, when no mail-coach was allowed to run oftener than once a week, or more than thirty miles a day!

And how easy everything will be made for tourists! Tickets will be issued available for a year on all lines by land and sea, with blue, red, or yellow coupons, according to class, for twenty-four hours’ board, inclusive of everything, at any hotel. Imagination runs riot

among the possible attractions to be advertised by the proprietors of the future Polar, submarine, or mountain hotels.

Let us hope that these increased facilities of locomotion, in themselves unproductive, will eventually lead to a universal cultivation of the earth; for all systems and theories can not alter the fact that man can not live on coal, iron, or glass. He requires corn, oil, wine, and meat for food; cotton, wool, leather, for clothing; and agriculture, cattle-rearing, and fishery must always form the staple of existence. It would be a grand thing for the world if the nations would conclude a peace, if only for a certain number of years. Then the millions of strong and active young men, who spend their best years in practicing the noble but costly art of war, might be employed, as were occasionally the Roman soldiers, in various useful works. They might drive the fever from Mesopotamia by the planting of a few million eucalyptus trees, then drain it and build towns, making the land what it was in olden times, a granary and garden of the world; and by international arrangement it might be colonized by the importation of thousands of the unemployed, discontented, and unproductive men who fill our great cities to overflowing. That completed, our regiments might then go to work at the rebuilding of Carthage and the colonization of the once fruitful country of Northern Africa. Here, too, is room for millions. Then might follow the irrigation of the Sahara by artesian wells and the planting of date-palms, so that a sack of this wholesome and nourishing fruit would be cheaper than a sack of potatoes. The French have already made a beginning with five hun-

dred wells and half a million palms. There would remain the cultivation of the greater part of South America, the establishment of waterways and railroads through the vast forest between the Orinoco and the Amazon, and the tillage of the Pampas by means of electric plows, sowing and reaping machines. Then we should have nothing to fear from overpopulation for the next few centuries. It has been calculated that the earth, properly cultivated, would provide space and food for forty times the inhabitants it has at present. And for the beautifying of the world and the benefit of mankind a few thousand million fruit-trees of various kinds might be planted on islands and moors, on prairies and steppes and mountain-sides, from the cocoa-palm and the banana to the pear. Another work for the quondam warriors would be the digging of various canals; in the first place, at Panama, the cross-roads for the four quarters of the globe, where would soon arise a city of Mammon, which would form also, in a spiritual sense, the Antipodes of Jerusalem, the true center of the world. Canals would also be of great service between Bordeaux and Marseilles, Leith and Glasgow, between the Black Sea and the Baltic, the Black Sea and the Caspian. The sea might be, in the same way, brought to Paris, Rome, and Berlin; and immense bridges of ixium, the metal of the future, might connect France and England, Italy and Sicily, India and Ceylon.

Were it not that humanity is too greatly possessed by the demons of avarice, egoism, hatred, and envy, these great projects might be realized, if not by armies which have lost their occupation, yet by companies who

could promise their shareholders handsome dividends. In any case, the principle of association will be carried to great lengths in the coming century. We have hardly begun to realize what it is possible to accomplish by the concentration of the capital, the influence, and the work of ten thousand men on one object. This principle will probably lie at the foundation of the town of the future. Built after a uniform plan, in accordance with the rules of hygiene and police regulations, it will become, by degrees, a block of similar dwellings, covered, perhaps, by an immense glass roof, having in the center an accumulator of electricity which will dispense to the whole light, heat, and force. This picture may appear fantastic and overdrawn; but the future will see things just as wonderful. A hundred years ago railways were denounced as unhealthful, dangerous, impractical. The cry was that they ought at any rate to be fenced off by wooden partitions. We are at all times and in all things men of little faith.

The results of association will be felt, too, in private and domestic life. In the year 2000 it will appear almost incredible that at one time, in a town of one hundred thousand inhabitants, every day, ten thousand maids in ten thousand kitchens lighted, with great trouble, ten thousand fires, producing smoke, soot, and ashes, in order to cook thirty thousand meals, which could be cooked much more cleanly, quickly, and cheaply by five hundred cooks in a central kitchen with electric stoves. We see, for example, how, on board a man-of-war, four or five men do well and quickly the cooking for six or seven hundred.

The heating of our houses, too, will undergo a com-

plete revolution. The day of fireplaces and stoves will soon be over. Large globes of opaque glass, in which burns decomposed water, will act as suns to the dwellings, the heat being regulated at will; and our great grandchildren will look upon chimneys and chimney-sweeps, which they will only know from picture-books, as hideous relics of a barbarous nineteenth century.

* * *

It is easy to predict that intercommunication on this gigantic scale will lead to an international similarity and community of thought and feeling. Cosmopolitanism will be the standpoint of the educated classes. Barriers will fall, and distinctions cease to exist. The leading nations—English and Germans, French and Russians—will extend their geographical boundaries more and more, seeking in further colonization a safety valve for their expanding power. And the yellow race, with its five hundred millions—a third of mankind—it is not impossible that it will follow their example, and, pouring into the Atlantic Ocean, through the Nicaragua Canal, overrun the South American Continent.

And this spreading of nations will lead to new conflicts, and, sooner or later, if not in Europe, the interests of France and Germany will collide in Africa, and those of England, Russia, and Japan in Asia. One of the principal features of the future will be a world press, which will call forth a world-feeling for the same world interests; and by that means the final, decisive conflicts for the mastery among humanity *en masse*

and against God will be made possible. And the gospel will be preached to every creature.

We may expect, as a natural consequence of such intercourse, that all languages will be much modified, influencing and permeating each other so that they will gain in generality and objectivity, and lose in subjectivity and individuality. Grammar and orthography will become simpler, but at the same time poorer and more stereotyped; and yet the language will grow richer in psychological expression. Hundreds of new words for new machines, appliances, weapons, clothing, animals, plants, and food will be as current and universal as are *beefsteak*, *cognac*, *sport*, *farmer*, *gutta-percha*, etc., to-day. We may be certain that the tourists of the future, in the hotels of the future, will speak a language which will be a potpourri of various tongues, English, as the most practical and, except for its irregular verbs and a few other difficulties which might be done away with, the easiest to learn, forming the groundwork. It is to be hoped that a practical abbreviation of the cumbersome words now in use will take place. Such words as "cosmopolitanism" and "electricity" are a disgrace to the nineteenth century. Why not, like the practical Londoner, who says "bus" for "omnibus," and "Zoo" for "Zoological Gardens," speak of "el" instead of "electricity," deriving from it "ellysis," etc.?

It is nonsense to dream of a universal language—"Volapük" or "pan lingua"—because the same language could never serve the purpose of the Hindoo and the Eskimo, the Icelandic fisherman and the Bedouin. But it is possible that, for purposes of commerce, a universal tachygraphy may be invented. If we consider that most

merchants and business-men use not more than six hundred expressions for their whole correspondence, we see how easily each of these expressions might be reduced to a sign, and serve for the whole world, as the Arabic numerals do. One sign would denote to send, *versenden*, *expédier*, *mandare*; and another, goods, *marchandise*, *ware*; and so on. The introduction of such signs would be but the beginning. A name for each would soon be found, and thus a universal, *if limited*, commercial language would be formed.

* * *

This picture has, however, its shady side. We are proud of steam and electricity; but in one sense steam has done us harm. Since by its means, and by the telegraph and telephone, there is such a great deal of time saved, we never have time for anything. Since we have conquered time and space, our lives have become shorter, instead of longer. Our grandmothers—I speak from personal recollection—baked their own bread, spun their own linen, embroidered their sofa cushions and rugs from patterns designed by themselves, or from flowers picked in their own garden, and had time, too, to read, with their daughters, long and solid books. Many a lady of to-day has not time to do more than look over a magazine or fashion paper. Electricity will make the next generation still more restless, excitable, and nervous; and yet tranquillity of mind and spirit is the only soil in which the Divine seed germinates. Living at high pressure, the use of stimulants and narcotics, of alcohol, opium, morphia, etc., gains the upper

hand in numberless cases. We see, too, the gradual increase of intellectual alcoholism, the symptoms and consequences of which correspond closely to those of bodily intemperance. An evergrowing craving for a new excitement, a new interest, and that in ever shorter intervals (probably in the future newspapers will appear every hour), stronger doses of piquant, exciting matter, followed by a corresponding reaction and consequent lassitude, and an ever-increasing weakness of the brain-nerves and intellectual power is what we have to expect. We find the same thing among Christians. Religious people live in a constant whirl of committee-meetings, conferences, lectures, missionary-meetings, social gatherings, and parochial entertainments; read all kinds of religious publications, controversial and otherwise; rush hither and thither to hear this or that popular preacher; in fact, they exhaust themselves in such excitements, and unfit themselves for good and useful work. Such feverish activity may be the lot of a few; but to the large majority the saying of the old Greeks will apply, "Zeus hates the all-busy."

It is a law of nature that trees do not continuously bear fruit, and shake it down. They rest through the long winter. The consequence of eternal spring in the Azores is that, as a rule, the fruit-trees perish of exhaustion.

It is difficult to see what absolute good humanity has derived from the enormous facilitation and the increased speed of locomotion and communication. To be on the move has a great charm for most men, and after a journey of several hundred miles in an express one has the feeling of having accomplished something.

But commerce flourished, too, in the times of Phœnicians and Carthaginians; and the merchants of Ulm and Nuremberg, who brought their wares from Genoa and Venice on pack-mules over the Alps, spending weeks on the journey, amassed great riches. Have we not all seen travelers chafing at a delay of twenty minutes, and then, an hour after their arrival at their hotel, yawning and wondering how on earth they are to get through the evening? One is constrained to ask why they are in such a desperate hurry to get out of one state of misery only to fall into another. Madame de Staël says with truth, "*En voyage on ne trouve que ce qu'on apporte*"—One only finds what one brings—and Loti's witty remark, "*Qu'on n'est bien qu'ailleurs,*" expresses the feeling of too many. The globe-trotter is one of the saddest figures of our modern civilization.

There is no question that the extraordinary development of travel tends to increase the weakness of those who lack strong individuality. It is healthful and beneficial for the mentally strong to make acquaintance with new peoples, new conditions of existence, customs, habits, and opinions. Under the varying form he is always able to recognize the operation of the same eternal laws. The weak-minded, on the contrary, are confused by it. It disturbs their mental balance. Their superficial beliefs are shaken when they hear the views of those who think otherwise; and amid the continual changes they come to regard the world as a huge fair, full of noise and deception, where everything is a mere matter of individual opinion.

Man can not overstep the harmonious bounds of nature with impunity. One of these is the correlation

of time and place with regard to human thought. The normal pace of a man is a meter to a second, as that of the snail is a millimeter. This pace utilizes space to the full. A greater rate of motion may be agreeable in itself, and valuable in the pursuit of a particular object; but it does not leave the mind time to profit by what is seen. Of course, I do not mean to affirm that the employment of steam and electricity is in any way immoral; but I do believe that we are not in a state of mental development corresponding to such a rate of motion. We are like the child who has a £100 note given to it, and who cuts it up to paste in its scrap-book. Man, in his higher state, on the new earth, will not only be master of the elements and forces: he will be himself a center of energy, shining like the sun, flying hither and thither at will, rising superior to weight, himself light and force.

Let us take care, too, that, dazzled by the advantages of association, we are not blind to its drawbacks. In an absolute sense we gain nothing by it. A £50 note is no more valuable than twelve thousand penny pieces; it is simply more convenient. In association there is as much lost as gained. Thickly-growing trees in a wood protect one another against the storm; but their individual development suffers. When twelve men of ability form a committee, their decisions are not twelve times wiser, nor their actions twelve times more resolute, but, in general, less energetic and spontaneous than if the matter had been in the hands of one strong man. Given the right man in the right place, he will, nine times out of ten, accomplish greater things single-handed than if he had been associated with others.

Even capable men neutralize each others' efforts, and their association has often the effect of paralyzing individual energies. Only the weak find in it a support. None of the members takes on his shoulders the blessing or the curse of his words and deeds. He shares it with his party at least; and the result is that, from public bodies, parliaments, commissions, one has come to expect a great deal in the way of fine speeches, but little or nothing of prompt and decisive action.

It is the same in practical life. A transatlantic liner is a triumph of association. But the first-class passenger and possible shareholder, who is taken on board as valuable luggage, and delivered up safe at his destination, has absolutely nothing to say in the affair, and derives merely a certain degree of ease and comfort from the luxurious and imposing whole. The Englishman or Norwegian who, alone, or with a few friends, crosses the ocean in his own little yacht, exposing himself to a certain amount of hardship and danger, does much more: he compels admiration; while it would never enter any one's head to admire the first-class passenger. When a sportsman in Africa kills a rhinoceros at a hundred yards with a patent rifle, he makes use of a product of association, a result of the thought and labor of hundreds of men who have contributed to the making of the weapon. The great hunter, Baker Pasha, felt himself a little boy compared to those Negroes who, by twos and threes, seek out the lion in his den, and kill him in single combat with swords of their own forging.

Who would make the better Robinson Crusoe on his desert island, the Norwegian fisherman or the highly-

educated president and members of a geographical society? Have we not seen scientific expeditions, like that of Franklin, equipped with all the resources and appliances of civilization, perish miserably amid the icy solitudes where the Eskimo lives happy and contented with his family? Dr. Kane, blocked in by ice in a Polar night, was astonished when his young Eskimo guide declared his intention of returning to his home a hundred miles off, and marched off gayly, arriving in safety too.

In association the individual sacrifices his freedom, his power, even his responsibility, in favor of the whole. In consequence he loses in independence, strength, and self-confidence. Although association produces, in many cases, splendid results, the sum of its achievements amounts to less than the performances of individual men. We see the same thing in history. Take the case of the Italian Republics of the Middle Ages, as contrasted with the centralized State of to-day. Where is there now a town like the Venice of old, which ruled the Mediterranean, and carried on war with the Turks singlehanded; like Florence, which defied pope and emperor; like the Hanseatic towns, which engaged in a struggle with Denmark and Sweden, or which could compare with Nuremberg in power and independence? It shows a natural reaction against the craze for forming societies of all kinds, for all objects, when we find a modern writer, like Ibsen, preaching, "Only he who stands alone is strong." There is a danger, however, of the reaction running to the opposite extreme. Even suppose it were possible for a man to throw off all responsibility, break all ties, he would become a

poor, wretched, bitter egoist. Luther and Bismarck, among many others, were strong through the fact that they were thinking and working with and for others. It must be borne in mind that association, as it exists at the present day, is not an organic and hierarchical edifice, but the contrary.

The evils of association are very apparent in the various industries. While agriculture, the primary vocation of man, which was regarded by the nations of antiquity as worthy of equal respect with the strength of the soldier and the wisdom of the priest, requires intelligent and individual work, the ideal manufactory is that in which the workman does one and the same thing all day and every day; for by this means the greatest possible quantity of uniform products is obtained. But this striving to make man a narrow specialist, though producing practical results, has an injurious effect on the mind, and is another instance of the conflict between mind and matter. For this reason this division of labor has led to bitter socialism. On the one hand, a man feels that he is not on earth for the purpose of making one movement all his life; on the other, the material and mechanical atmosphere in which he lives kills in him spiritual and intellectual cravings, so that at last he comes to believe that the world is nothing but a machine of matter and force; and the more deeply he thinks the sooner he comes to that belief.

Strange to say, and contrary to the expectation of many, the spread of the principle of association has only accentuated the difference between rich and poor. The number of the homeless and the destitute has increased,

and also the number of millionaires. It is to be feared that money will play a still greater rôle in the future. Nothing blunts the intelligence and feelings like the constant dealing with money. America has shown us two financiers who, beginning with nothing, left millions; and yet, with all their sharpness in money-making, they were of narrow intellect, quite heartless, and so lamentably ill-educated that one of them could not write a sentence without a mistake. We can not foresee what the "ring" will lead to, and to what lengths it will go. It can hardly be prevented by law. Why should not a few wealthy men in Bremen, if they choose, buy up the tobacco-crop in Porto Rico, and sell it at any price they please? This system of mercantile boycotting will reach its climax when no man will be allowed to buy or sell save he that has the mark or the name of the beast on his right hand or on his forehead. (Revelation xiii, 16, 17.)

Machinery—this offspring of the thoughts of the many, this intellectual petrification—revenge itself on its authors. The Egyptians, Assyrians, and Babylonians knew what they were doing when they employed only human labor. That they could have invented machinery is proved by their method of watering the hanging gardens. The Egyptian priests, too, caused the brazen gates of the temple to open, while the fire burned upon the altar, by means of steam; but they would have considered it sacrilege to have their statues, sphinxes, and obelisks manufactured by machinery. They venerated individuality as we do association. Machinery takes its revenge. Not the worst it can do is to seize its creator, and tear him limb from limb; it takes possession of the

intellect which went to its making, petrifies it, so that it remains latent. The galley slaves, in their tremendous struggle with wind and waves, had more moral gain from their exertions than has the machinist who simply watches his machine, oiling it from time to time. Practical and useful as the typewriter undoubtedly is, he who uses it instead of writing a characteristic hand of his own loses somewhat mentally. It is the same with him who makes his mathematical and astronomical calculations by the help of the marvelous calculating machine of Babbage; and with him who, by means of the rotatory apparatus and electric light, manufactures one thousand yards of photographs daily rather than make one sketch from nature. The mechanical process of photogravure is killing the beautiful art of wood engraving. Telegraph, phonograph, and telephone tend similarly to the mechanising of language. We boast of having overcome matter, time, and space; but it is they who conquer us, for they are invincible.

Lastly, we are proud of the high pitch which we have reached as regards the comfort of daily life, compared with that of our ancestors. Here, too, we are curiously inconsistent; for we teach our children in all seriousness how Hannibal's soldiers were enervated and made effeminate by a single winter of luxury at Capua; how the young Persians and Spartans became heroes by enduring hardships and exposure; and then we scold if they go out without something warm about their necks, or stand in the sun without their hats, and try to make them as delicate as possible. The refrain of our history lessons is always, As soon as a nation gave itself up to

luxury and sensuality, it lost its ancient strength and virtue. This is theory; but in practice our aim is to make our lives as luxurious and enjoyable as possible. Day and night thousands rack their brains to invent and manufacture all kinds of articles to save their fellow-creatures a movement or a few steps. And we are glad of it, and are grateful for any appliance or invention which spares us trouble and makes life easier, looking with contempt and self-satisfaction on people who, from principle and for their health's sake, prefer to lead a simple life.

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In spite of all, however, we are not really smaller than our forefathers. Whether savage or civilized, whether Greek or Englishman or Chinese, whether world-conquering or weary of existence, man is and remains great, and humanity and its history a spectacle for devils, angels, and God himself. As his greatness is not of himself, neither can he deprive himself of it. He is king of creation by the grace of God. He is great in his poverty, his nakedness, his hunger; for the world can not satisfy him—great, too, in his wickedness and impiety. And because he is great, his conception of life is great too, whether it be the patriarchal idea of the nomads, the æstheticism of the Greeks, the power of the Romans, or the science of the present day; for inseparable from all are his great love and hatred, his belief and unbelief, his hope, his sorrow, his doubt, and despair; and whatever his condition and views, he wrestles, even if unknowingly, with God and the devil for his soul, and would be willing to sign it away to

any who would still his hunger, end his doubts and torments.

This son of earth, brief as is his stay, yet makes his presence felt as lord of creation. He weighs and measures the invisibly small, and also the twinkling stars and their immense distances; has made for himself eyes which see a world in a drop of water, and descry solar systems in the infinity of the firmament. He rides on fire, and fire carries him over the seas, forges his weapons, sows his corn, bakes his bread, weaves his clothes—an obedient servant. He portrays with the ray of light the invisible stars, the cannon-ball in flight, or the inside of man, and speaks by the lightning from the Old World to the New. He hovers in space between the infinities of greatness and minuteness of form and color; swims in the pure ether which is filled with energy, and is yet so weak; lives in a world full of life, and is the prey of death; a world of light, and has obscurity in his brain and darkness in his heart. He comes into the world, whence he knows not, looks about him, struggles for his life with the forces of nature which would destroy him, then grows pale, hangs his head, dies, and disappears from the earth. His fellows do not know whither, but they have no time to let it trouble them; they, too, must work and struggle till their time comes.

Weary of the struggle; recognizing the futility of his efforts to make of this earth a paradise, or even a place where he can lead an untroubled existence, and the utter uselessness of attempting to reform society; tired of himself and others, the man of to-day turns to nature, hoping to find in her unchanging laws and the

study of her uniform and regular phenomena some rest and satisfaction for his troubled soul. This tendency and temper of mind is but another step in the evolution of the race as conceived by the believer in the Bible. And "God is not far from every one of us;" but opens the eyes of him who desires to look into the wonders of his creation to find there healing from his artificiality, his errors of imagination, his selfishness.

To summarize briefly, modern science sees the universe as a magnificent whole, animated in the infinitesimal atom and throughout the immensity of space by wondrous forces in obedience to fixed laws; a picture passing human comprehension, yet the contemplation of which, to him who has grasped in some degree its eternal principles, brings strength and joy in living.

CHAPTER III

Christians and Science

WE have seen what a grand conception of nature and the universe is presented to us by modern science. The question now arises, What is the attitude of Christians—by which we mean Christians in reality, not merely in name—towards this knowledge given by God to man for his bodily and spiritual good?

Unfortunately the answer must be that Christians in general take up, with regard to science and scientific research, a position unworthy of their profession—a position, if not antagonistic, yet distrustful, inclining to ridicule, or at least to avoidance of the subject.

Instead of giving time and pains to the study of the achievements of scientific investigation, a work at any rate historically important in itself and its results; instead of taking the trouble to sift the true from the false, fact from theory, and manfully opposing and refuting any false deductions which science may draw; instead of rejoicing in the ever-widening horizon which it opens to the mind, most Christians prefer, after letting off a few random remarks about the non-infallibility of science and scientists, to retire to the domain of edification and the emotions, where they believe themselves safe from the obstinate logic of facts, the inexorable mathematics of the universe, as if knowledge were not

edification, and the creation of the world an act as divine and worthy of contemplation as its redemption. Is not the law of Moses based upon a divine conception of nature? Does not David seek edification in the contemplation of the work of God's hands as well as in his law? And do we not see how Jehovah himself, when he appears in a whirlwind to convince Job of the insufficiency of his own judgment, points in majestic words to nature as a revelation of a power and wisdom so divine that man can only bow before them in awe-struck silence? Of what do the prophets speak? With what does the prophecy deal which we are warned not to despise? Certainly, in the first instance, with the fulfillment of the promise made by God to the children of Israel; but also with the redemption of creation and the restoration of a divine nature. And this restoration forms the closing theme of the Book of Revelation.

The Bible is full of nature, of the relation of mankind to nature, and of the ultimate renovation of a nature divine and eternal. How should it, then, be otherwise than edifying to us? He who fails to find edification in the whole of God's creation has not rightly grasped the meaning of the word—a spiritual building-up of man in God—though we gladly admit that there exists a special Christian edification. Does not man live by every word that proceedeth out of the mouth of God; therefore also by the words of creation in the first chapter of Genesis? And yet many a theology regards matter as a substance, created by God, it is true, but since then repudiated and rejected by him, governed now only by certain natural forces, and devoted

to ultimate destruction, and the whole of nature as corrupted utterly and hopelessly by Satan, and entirely in his power, although St. Paul expressly declares to the pagan Athenians, "In God we live, and move, and have our being." Such theology fails to recognize that creation is a divine work, full of divine and eternal principles; that the stone, the plant, the animal, the human being, here kept in life by the breath of God, and destined to unfold to all eternity in the heaven of heavens, are given by him to man that he may be able to comprehend in some degree his power and greatness. Thus the understanding is closed to the importance of creation as a revelation of the Godhead. No wonder that such a theology should be regarded by an age which is learning ever more and more of the secrets of nature and her forces, and becoming more and more conscious of their importance and universality, as a moribund system which has not been able to keep pace with the intellectual development of humanity, and which is, therefore, of no practical value or use.

This narrow mistrust and timid evasion of natural science has an injurious effect in two respects. In the first place, it is injurious to the individual Christian in causing him to neglect this God-given opportunity of enlarging the scope of his thoughts and ideas, which neglect, logically and of necessity, results in harm to his spiritual life. For we receive our impressions and ideas from our surroundings. "That which may be known of God is manifest in them; for God hath shewed it unto them; for the invisible things of him from the creation of the world are clearly seen, being understood by the things that are made." (Rom. i, 19, 20.)

Otherwise God might as well have let us live and die in a monk's cell, as so many have thought and done. "Luther, in his 'Table-talk,' " says Liebig (*Chemische Briefe*, p. 84), "excellently describes the awakening pleasure in nature and the study of nature observable at the Reformation: 'We are now in the dawn of a future life; for we are beginning to attain again to the knowledge of creation which we lost through Adam's fall. We are now looking closely at the creature. We are beginning, by God's grace, to recognize his wonders and works in the very flower. In his creatures we learn the power of his Word.' " Man is created a perfect whole. He can not let his need for knowledge with regard to nature starve without his spiritual knowledge suffering; and if he lives in a vague, foggy, uncertain relation to the visible creation, how are his ideas of the Invisible to be clear, definite, and independent? He who desires to think clearly and logically about abstract things must accustom himself to such a mode of thought by exercising it on the concrete. Feeling, nature itself teaches us, is not an action on the part of any organism, but simply a passive quality which, unduly developed, weakens the power of resistance and the vital energy. By feeling alone man does not grow in his inner life.

In the second place, the community of Christians places itself, by this attitude, outside the pale of a cultured humanity, which, in respect of science, undoubtedly has advanced, and by this means loses touch with the intellectual life of the present. No wonder if the God-fearing, even though not Christian, naturalist smiles good-humoredly at this kind of Christian as an enthusiast who refuses to accept the clearest mathe-

matical proof of what he does not choose to believe, and yet requires of others that they should believe unconditionally in miracles which, from their standpoint, are unproved. No wonder that many a youth, on going to the university, has felt like one who said, "My whole Christian conception of the universe has fallen to pieces in view of this much grander and more impressive conception which science presents;" for it has been said, with reason, "The God of the present-day scientist is a Being greater, more powerful, and more terrible than the God of many Christians."

It is time that a believing theology should set itself the task of giving to the masses a conception of nature founded both on the words of the Creator and the facts of creation, a task more profitable than arguing with those who boast of their unbelief; for the spiritual death from which such negations spring can not be conquered by refutations and counterproofs, but only by spirit and life. Shall the son of the house understand less of what his Father does than the stranger? That is just what raises doubts with the world as to the sonship claimed by Christians, that these children of God know and care to know so little about the works of their Father; nay, even behave as though the contemplation and study of these works were rather hurtful to them, and might lead to estrangement and even to a denial of this Father. "Theology will find out in good time," says Lowell, "that there is no atheism at once so stupid and so harmful as the fancying God to be afraid of any knowledge with which he has enabled man to equip himself." What! The son of a celebrated architect ought not to study his father's buildings! The sons of Bach ought

not to have listened to his Passion music, lest they might lose the filial reverence which they had hitherto had for him, lest they should even begin to doubt whether their father had ever existed. A thousand times, No! Whoever says he lost God through studying nature never really possessed him. Is it not written, "The Spirit searcheth all things; yea, the deep things of God?" "Why think so earthly of thyself?" says Jacob Boehme. "Why lettest thou thyself be mocked by the devil as if thou wert not the child of God, born of his nature? How shouldest thou not have power to speak of God, who is thy Father, in whose image thou art made? Behold, is not this world God's? And if God's light be in thee, it is also thine."

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What is, then, the reason why so many Christians hold themselves aloof from modern science, and regard it with undisguised suspicion? Let us consider a few of the various causes. In the first place, it arises from ignorance of the methods of science. Frightened by technical terms and names, and by the obscure mode of expression, which many men of science think fit to use, they immediately jump to the conclusion that the comprehension of such things is beyond them. They have neither the time nor the brains to arrive at an understanding of them. That may be true of the detail of most sciences; but a knowledge of the great questions which interest humanity is within the grasp of almost every one. A man of average intelligence, with the most elementary acquaintance with mathematics, can,

in a few hours, with the help of a simple work on astronomy, satisfy himself of the possibility of measuring the distance, size, and weight of the heavenly bodies, and that the earth really revolves round the sun. He can be as certain of these facts as that $3 \times 15 = 45$, and need take no one's word for it. As there are, however, educated persons who have so little notion of mathematics that their brain reels at the mere mention of billions and trillions, as if these terms represented something vague and mystical, let us show, by a few examples, how simple astronomical calculations can be, even though running to quintillions and sextillions. How many grains of sand would the earth contain if it consisted solely of sand? Let us take a grain of sand, with the intervening space as equal to one cubic millimeter. At that rate a cubic meter contains one thousand million grains; that is, $1,000^3$. We know that the earth's circumference is 40,000 kilometers. Its contents is, therefore, 1,080 thousand million cubic kilometers. This number, multiplied by one thousand million cubic meters, and this product again multiplied by one thousand million cubic millimeters—a total of 1,080 and 27 ciphers grains of sand. As we know the weight of a cubic meter of sand, we can, in two minutes, calculate the weight of an earth of sand. Or, if we put the question, How long would a snail, crawling at the rate of one millimeter a second, take to crawl round the earth? the calculation is still simpler. The earth's circumference is, as we have just seen, 40,000 million millimeters; consequently it would take just so many seconds—1,268 years, 142 days, 23 hours, 6 minutes, 4 seconds. A child of ten could work it out. It is evi-

dent, however, that this calculation is not absolutely correct, because made in reference to an imaginary horizon-line; and this brings us to a second point, too little taken into account by the lay mind; namely, that every calculation and measurement in daily life is, and requires to be, correct only to a certain degree. No joiner measures a table exactly; no market-woman weighs you out exactly a pound of butter; and if any one imagines that with so many ten-shilling pieces he receives absolute size and weight, he is mistaken. They are worn; they are not absolutely equal, nor of full weight; they weigh differently at the poles and at the equator, on a mountain and at the sea-level. Our measurements are, then, like all our knowledge, only relative; and the man of science must not only know how to measure, but—what is often more difficult—how far his measurement is exact. But the errors, too, are only relative; and if an astronomer, in weighing the sun, makes a mistake of one thousand million kilograms, that weight is still, comparatively, more exact than when the chemist weighs you out a grain of quinine. We know the distance of the sun to within one fifteen hundredth. It would be impossible to measure the length of your garden so exactly. To talk of astronomical measurements as valueless and deceptive, even though they be several millions of miles out, shows a great lack of sense. Of a stellar distance of four billion miles one million miles forms but $1/4,000,000$; is, therefore, inappreciable, a negligible quantity. Or, if the question is asked, How is it possible to calculate the revolution of one of Jupiter's satellites to within one-tenth of a second? the answer is that it can not be done in

one revolution. If I fix the starting-point, allowing for an error of half a minute, count six hundred revolutions, and then fix the concluding point with the same allowance, it amounts to not more than one minute, distributed over six hundred revolutions, to only one-tenth of a second, over six thousand revolutions to only one hundredth of a second.

Any one who knows the simple axiom of trigonometry, that, given the base and the two adjacent angles, one has the triangle, can, by means of even a home-made theodolite, measure, from two windows of his house, the distance of a tree, a tower, another house; and, in the same way, the distances of sun, moon, and stars are measured by astronomers.

The difficulty does not lie in the simple and mathematically infallible process, but in the numerous precautions, forming almost a science of themselves, which alone make exactitude possible for great distances, and enable us to measure the largest and the most distant of the heavenly bodies, and the diameter of a hair ten yards off. Similarly, in chemistry, in physics, and in geology, great learning and knowledge of a special kind are by no means indispensable to a clear understanding of the methods, facts, and limitations of these sciences; for here the ground-principles are both convincing and intelligible.

The first thing to be sought after is a clear comprehension of the methods of observation and control employed by natural science. Let us not rest content with reading popular works on the subject, which, in the strain after effect, rarely touch the root of the matter, or give a true idea of the methods of investigation.

The thing of greatest importance in the study of any science is just what is least interesting to the majority of people; for instance, in geology it is a clear understanding of the formation of the various strata and their manifold faults; in astronomy, its mathematical groundwork and the exact and laborious process of observation and its regulation; in chemistry, the theory of atomic weights and the deductions from it. He who is ignorant of these fundamental principles can not judge for himself. He will be tossed to and fro between the varying and often contradictory theories and explanations of professors and amateurs as taught in books and lectures. The mastering of what is necessary to definite knowledge in science involves no very great expenditure of time and trouble. If the time wasted in aimless and fruitless discussions on science, materialism, and Christianity were spent in the serious and methodical acquisition of the elementary and fundamental truths of science, there would be a great gain, both in clearness and definiteness. The knowledge of the specialist is, on the whole, unnecessary to a right conception of nature and the world. The true man and the genius alike feel the need of education in all directions and the danger of losing one's self in details. Every educated man ought to know what an ammonite is, the limits of size (from one and one-half millimeters to several millimeters), the distinguishing characteristics of the various species, the chambers and lobes, and have an acquaintance with certain types and the principal strata in which they occur—*e. g.*, *Am. Bucklandi*, *Am. Amaltheus*—but it is quite unnecessary to know the four, or, according to some, eight hundred varieties, their Latin names,

where they are found, etc. Only the knowledge which a man acquires for himself is of value to the mind; and Galileo was right in saying that it is a misfortune when a man takes the opinion of others, and not the nature of the things themselves, as the basis of his ideas. Much as we should revere and admire true knowledge and ability, a childish veneration for the professor and his dogmas is to be deprecated as injurious in its effects.

In the second place, the nervous distrust of science prevalent in certain circles arises from a confounding of fact and explanation. A fact is that which can either be mathematically proved, as that the three angles of a triangle are together equal to two right angles; or that which can at any time be demonstrated by experiments—*e. g.*, that oxygen and hydrogen combined form water; that chlorine and sodium (common salt) produce in the spectrum a particular yellow line in a particular place; or, lastly, that which is attested by sufficient and credible testimony, as that meteorites fall from the sky. A fact is a truth in the universe, against which theories and systems are powerless; facts are obstinate things, as the witty Frenchman said, "*Il n'y a rien de si bête qu'un fait!*" There is this peculiarity about the obstinate fact that, as there is none in itself either good or bad, there is none either religious or irreligious. Since ever the world began, and so long as heaven and earth shall last, there never has been and never will be a fact to prove that there is no God, or that the soul is not immortal, or that Jesus Christ did not come to earth as God-man to die for our sins; and there is no fact which proves that there is no resurrection of the dead, and that the sick can not be healed by prayer, for the reason that

facts have no negative proof-power. The fact that thousands of millions of stones during centuries have never given the least sign of animation does not alter the fact that the loadstone attracts iron, even without their being brought into contact—one of the most remarkable phenomena connected with matter, by the way. Facts by themselves are, like the unpointed Hebrew consonant-writing, hollow, colorless forms, without any meaning. They only become alive with color and sound by the addition of the vowels. And as in that language other vowels can be put to the consonants, or the same arranged in different order, so as entirely to change the sense, we see every day how the same fact may be interpreted differently, or even in direct opposition.

Facts are like words, which, even though embodying a thought and meaning in themselves, when taken singly are devoid of sense—house, read, sand, before. A spiritual force and intention must link them together; then a reasonable sentence arises. And here, too, everything depends on the arrangement; otherwise the subject may become the object, and *vice versa*, or cause be confounded with effect. Bacon tells us that no phenomenon, taken by itself, explains itself; but that what is connected with it, carefully observed and rightly placed, leads to understanding. Every phenomenon has its reason; every effect has its cause. Tell a German peasant that the line of hydrogen in the spectrum of Sirius shows a displacement towards the red, and he will gaze at you open-mouthed, and, if he finds words at all, probably say, "I do n't care." This fact, which has no connection with anything in his brain, is absolutely meaningless to him, and would remain so, even if you were

to show it to him in the spectroscope. It would be of less use to him than a rough diamond to a child. But make the same remark to a man who understands astronomy. Immediately there arises in his mind a series of interesting and exciting ideas. He recognizes from it, by the aid of certain other facts known to him, that this giant sun is receding from us at the enormous speed of eleven hundred and eighty-eight kilometers a year; and, according as he is possessed of a larger or smaller share of imagination, he sees with the mind's eye this great world rushing on through time and space towards an unknown destination—a spectacle than which earth presents none more imposing.

The explanation of facts is what every one—the greatest savant and the greatest ignoramus—thinks of as background to the fact itself. It is, therefore, his private concern; he must test it *sine ira et cum studio* as to whether it accounts satisfactorily for the fact, and tallies with it or not, in which case the explanation is occasionally found to put more into the fact than really lies in it.

A striking example of this premature confusion of observed facts, with the theories rightly or wrongly deduced from them, is afforded by the Darwinian doctrine. In view of the great excitement into which the world of thought was thrown by this doctrine, which was taught by Empedocles (B. C. 470), then held by Lamarck, and further developed and enriched by Darwin with the theory of natural selection and the descent of man, it will be worth our while to go into it more fully.

Lamarck, in his "Philosophie Zoologique," had tried to prove that the animal world consists of a connected chain, beginning with the infusoria, and ending with man. He explained the evolution of organisms by adaptability to circumstances. "The giraffe, living in the interior of Africa, where the ground is always dry and barren, was compelled by circumstances to feed on the foliage of the trees. By constantly raising the fore part of the body, and stretching the neck, both at length became so long that its mouth could, without effort, reach the leaves at a height of six yards." (Professor Quenstedt, "Die Schöpfung," p. 24.)

Similarly, according to Lamarck, "the efforts of some short-necked bird to catch fish without wetting himself have, with time and perseverance, given rise to all our herons and long-necked waders." (Huxley, *Darwiniana*, p. 12.) He presupposes "*un temps énorme*" in support of his theory.

During the expedition of the *Beagle* to South America, 1831-36, Darwin's attention was first drawn to the variations which organisms—animals in particular—undergo subject to the varying influence of climate, food, breeding, and altered physical conditions of any kind. He studied still further the changes produced by these external influences during the course of several generations, and found in many organisms a most remarkable adaptability to outward conditions. He found that this adaptability is furthered by natural selection, according to which those individuals which survive as best fitted for the struggle for existence multiply among themselves, transmitting their peculiarities to their descendants.

Darwin would have remained on the unassailable ground of fact if he had confined himself to the statement of the following propositions:

1. The species possesses a certain plasticity, which renders it capable of adapting itself to outward circumstances, and in such a way that externals—color, hair, etc.—undergo greater modification than the internal structure, skeleton, intestines, voice.

2. Adaptability has its limits. When the limit is reached, the individual perishes, and the species dies out. The nearer the forms are to the original of the species the more vitality they possess; the further they deviate from it, the more perishable they are.

3. Let the external influences become once more what they originally were—as, for example, when culture ceases, and plant or animal becomes wild—and the species returns to the original type. There was a great fascination in the thought of this plasticity of organisms as unlimited, given time unlimited. It provided an explanation of the origin of all species from a primordial cell. On this theory the word “species” has only a relative value for a certain length of time; in that case, however, it is difficult to see the necessity for the immense variety of types; for example, Why was there not one single type for the same waters?

Darwin says of Lamarck’s giraffe: “The giraffe did not get its long neck by continued stretching, but by natural selection. Africa was overtaken by great drought, the vegetation of the ground dried up. Only a few animals accidentally possessed of long necks were able to subsist on the leaves of trees. All short-necked animals, if they were unable to climb, died out. Long

necks became hereditary, and if this drought recurred frequently a giraffe-neck would eventually be produced." (Quenstedt, *Die Schöpfung*.)

With this view or theory, however, Darwin stepped from the region of fact on to the uncertain territory of mere supposition, of intellectual speculation. It is true, he himself spoke of it with diffidence as an idea which awaited the confirmation of fact, and hoped to find the missing links; but, as is usually the case, his disciples and adherents seized upon it at once, and elevated it to the position of a creation-dogma. It was just what too many wished, to be able in offering mankind a fascinating and ingenious theory to proclaim the final victory over the legendary and old-fashioned Bible-story of the creation, and to drive the old Creator, if not altogether out of his creation, yet to its extremest limit, into the primitive cell of the primitive age. Many thought: Just one kick more, he will fly into nothingness, and we shall be rid of him forever! Spiller says, "*Unfortunately*, Darwin himself is of opinion that the original form of all life received the breath of life from *the Creator*." (*Das Leben*, p. 72.)

Many a Christian read with anxiety the tidings of the new doctrine of the evolution of all living beings, and considered within himself whether he would not, after all, be obliged to give up his old ideas of the Creator, or bring them into conformity somehow with the progress of science. But inexorable facts placed themselves against this fascinating theory. The plasticity of organisms has its limits.

No amount of cultivation, no gardener, is able to make an apple of a pear, an apricot of a peach, similar

as these forms are. In the same way all the patient and costly attempts of the Prince of Schaumburg to breed a cross from hares and rabbits for purposes of sport have been unsuccessful, although the two species differ almost solely in the fact that the rabbit brings its young into the world blind and destitute of hair, and therefore lives in a burrow, while the young hare, as soon as it is born, runs off open-eyed and well-clothed, and for this reason lives in the open. The mule, the cross between horse and ass, is sterile. It is a fact that all varieties of tame pigeons—tumblers, pouters, carriers, and fantails—left to themselves on a desert island, return to the original slate-colored wild pigeon, even regaining the two dark rings round the legs. That was one of the first things which attracted Darwin's attention, and which ought to have set him on the right track. In the absence of cultivation, the four, some say six, thousand kinds of roses, Maréchal Niel and Gloire de Dijon, mossrose and monthly rose, La France and Viscountess Folkestone, become once more the sweet and simple wild rose. The naturalist knows, too, that the numerous varieties of dog—St. Bernard and pug, mastiff and terrier—can be led back to the ground type, the wolf (*canis lupus*), the fox, or the jackal. The finest kinds of fruit soon return to the wild state; the choicest strawberry, through lack of care, degenerates into the wood-strawberry, and the finest pears produce, in the second generation, wilder varieties, a return to the original wild pear.

How fixed and unchangeable the type is can be shown by many examples. The grains of wheat found in Egyptian mummy-cases produce a plant identical

with, though larger and more fertile than the present. So do the seeds of corn-flowers and clover found in Celtic tumuli, two thousand years old. In Egypt the mummies of the ichneumon, the serval, the Nubian cat, and the wildcat, though four thousand years old, are exactly like those animals to-day. Even varieties of them are recognizable. The swallow builds her nest and the bee her honeycomb, the spider spins her web, in the same way as they did three thousand years ago. The hazelnuts and other fruits found in the lake-dwellings and at Pompeii are the same as those we know. The primitive bear and lion differ from the present-day species only in size; and we have seen that the oldest human skulls can, on the whole, compare favorably with those of to-day as regards facial angle, formation, and capacity of skull.

The fact, then, that in the case of organisms known to be four thousand years old we find the very species now on earth, only with such differences as at all times distinguish one individual from another, justifies us, I think, in opposing to the arbitrary assertion of the Darwinist that, during immeasurable periods of time, species do change, the assertion—arbitrary, too, but more borne out by facts—that they do not change.

In geology and the study of fossils we find the strongest proofs of this. Here facts speak altogether against Darwin. In the strata which, according to the Darwinians, are many hundred thousand years old, are found leaves and branches of the elm and lime-tree, precisely similar to ours. In the amber of still older formations spiders occur, and in Solenhofen slate dragonflies, and in the strata containing coal araucarias, tree-

ferns and palms like those growing in the tropics to-day. These species of plants and animals appear by hundreds, and then die out, disappear, and make way generally for higher forms, without even making an attempt to work themselves up to these higher forms. In the first place, after a number of small water-creatures we come across an immense plant-creation, the present coal. That disappears, and the Jura arises, with its millions and millions of saurians, or lizards, with pterodactyls and a few birds. After that the chalk formation, with modern sharks, quadrupeds, and our foliage-trees, covers the earth for the most part, till in the alluvial deposits man appears for the first and last time. There occur, here and there, intermediate forms, as everywhere in nature nowadays; but nowhere are there transitional creatures. Let us consider a few of the types from these great divisions. After a few anthracites formed of seaweed in the oldest gneiss formation (Dr. Sorge), the first traces of animal life appear, not, as the Darwinian theory would lead us to expect, in the shape of sponges and corals, but of the highly-developed Bohemian trilobites in hundreds of varieties, crustaceans, with perfectly formed head and as many as eight thousand facets in the eye. (Quenstedt.) Small and unimportant organisms remain quite unaltered and unaffected by any evolution through all geological periods, embracing, according to the Darwinian theory, many millions of years. There are a few kinds of snail, which, in course of time, have evolved one from the other; but it does not do to base a system on certain anomalies and freaks of nature. Of what import are such exceptional cases in face of the thousands and millions of or-

ganisms which have not changed? The small shell *lingula*, for example, occurs in the oldest Fucoid sandstone, together with the first and simplest plant forms, and has remained unchanged. Quenstedt says (*Petrefaktenkunde*, p. 556), "Many of the terebratula are identical with the living *Waldheimia*." Many kinds of nautili encrinites and pentacrinus, only smaller, live at the present day in the seas of the Antilles; likewise *limulus*, the Molucca crab sold in the markets of Java. Why have these organisms not developed at all? Similarly we find in none of these strata a calamite or equisetum developing into an araucaria, a trilobite into an ammonite; or a plesiosaurus or ichthyosaurus, which looks as if it were endeavoring to become a shark; or a fish gradually maturing to a turtle or a crocodile; or a bird on the way to becoming a quadruped. The birds and insects, in fact, appear as exclusive kingdoms. Nowhere, in spite of the billions of organisms and the immensity of geological ages, is there an instance of a plant or a tree gradually growing into an animal.

It is precisely the same with the upper and later deposits. The dinotherium and the megatherium, the mastodon and the mammoth, do not evolve from lower animals, but all of them—these colossal, wild, weird forms—march up at their Creator's word *after their kind*, and make their exit *after their kind*. Inflexible, obstinate in their characteristics, consistent in their appearance, making no attempts at adaptation or transmutation, they die out when the state of things on earth no longer suits them, leaving it to their Creator to invent fresh types adapted to the new conditions.

To this, the greatest objection, Darwin replied that

the missing links would be found sooner or later—a bold assertion. Since then we have explored the earth still more widely. We have dug for water in the Sahara, for coal in Spitzbergen, and in Australia for both. New Zealand and Siberia, Ceylon and South Africa, have been the subject of geological research; and the book of the earth's crust, with its thousand pages, has been perused tolerably thoroughly. Everywhere the millions of fossil illustrations of past ages show us many species simultaneously and successively; but *nowhere are there instances of gradual transition from one species to another*. This is acknowledged, not only by Christian naturalists, who might be suspected of partiality in the matter, but also by noted antichristian scientists.

Let us see what they have to say on the subject: Cuvier pointed out to Lamarck the fact that the ibis in Egypt had not changed during four thousand years. Liebig writes, "Strict scientific investigation knows nothing of a chain of organic beings." (*Chemische Briefe*, p. 366.) Wigand, in the year 1874-77 published a thorough refutation of Darwinism in a comprehensive work with that title.

Dubois-Reymond says calmly and ironically of the theory of natural selection, "In holding to this theory one has the feeling of the drowning man clinging to a plank which can not do more than just hold him above water."

The well-known editor of *Natur*, Dr. K. Müller, writes: "We believe that it is impossible to know anything of the origin of species because it is removed beyond the perception of the senses; even if we place ourselves on Darwinian ground there is no possibility of

our seeing a new species originate from an older one, though we should live a thousand years." Haeckel, himself a Darwinian, takes the same view in determining the periods as of infinite duration. This excludes all idea of sensible perception, the basis of all knowledge, and we come to think with Hegel, that all philosophy originates from a postulate, from a proposition which we must be content to accept without explanation. (*Die Natur*, April, 1888.)

Dr. Kalisch writes: "The immutability of species can only be refuted by experimental proof of their changeableness; but when will this be possible? Will it ever be possible? And as regards natural selection, has this been proved in any single instance?" (Berlin, 1883. *Erwiderung gegen Dubois-Reymond über Goethe.*)

The conclusion of an article on the subject by the well-known materialist, Professor Vogt, of Geneva, runs thus: "Let it suffice to have referred to these extremely involved ideas. On all sides we meet with the greatest variety in the individual species. Here we have animal organisms which, so far as we know, have remained unchanged through æons, and have adapted themselves to any condition of existence. There, on the other hand, are others which have passed through numerous stages of transmutation in different ways. Others there are which, after a longer or shorter period of existence, perished without leaving any visible descendants. Let him who can reconcile these facts. So much, however, follows from them, that the dogma, according to which a similar structure denotes a common origin, and on which our entire phylogenetic (genealogical) investiga-

tion rests, can not claim to hold good in every case. The *onchidium*, with the eye of the vertebrata, is not a descendant of the vertebrata, nor the vertebrata of the onchidium. The American horse is not descended from that of the Old World, nor *vice versa*. The South American llama has not a common ancestor with the Asiatic camel, etc. Investigation will perhaps find the solution in each individual case, perhaps not; but in any case it is better to say: 'We have not come down to daubing the gaps over with a dogma which the first rain will turn into clay.' "

With regard to the oft-cited similarity of all embryos, that of man, as well as of higher and lower animals, Vogt says: "No anatomical, no embryological investigation has so far been able to give the slightest hint as to how the nervous system of the *annelida* has been transformed into the central nervous system of the *vertebrata*; and yet this nervous system is the first thing originated in the embryo of a vertebrate animal."

Concerning Hensen's observations on the *plankton* (the German collective scientific name for the minute organisms living in sea water), Dr. K. Müller pithily remarks: "These forms of life are beings built up under the most transparent and uniform conditions, so that one might expect to find in them the easiest path to the comprehension of the conditions of development. And yet the way trodden by Darwinism shows itself here more and more impassable. The closer the investigation, the sharper becomes the distinction between the species; and in many cases hitherto looked upon as instances of transition more recent observations have shown the supposition to be at fault. Nothing is more

hopeless than to explain by means of the Darwinian theory the origin and existence of this infinity of varieties under conditions so uniform as those afforded by the sea."

So far back as 1868 the celebrated anthropologist, Professor de Quatrefages, expressed himself as follows respecting the descent of man from the monkey, which Darwinism demands as a logical conclusion: "Embryogeny unites with anatomy and morphology to show how greatly in error are those who teach in accordance with Darwin's theory, the descent of man from the ape."

Dr. K. Müller writes: "We have long held that between the animal and the human mind there exists an impassable gulf, which is not to be bridged even by the assumption of a link, an ancestor extinct and untraceable. Each organism represents a particular idea in the series of organisms." (*Die Natur*, September, 1878.)

Finally, to quote Professor Virchow (at Frankfurt, August, 1888): "I can make nothing of the idea that man evolves from an animal; for, as a matter of fact, the links do not exist which would exist if they had ever lived. *The immediate ancestor of man, the missing link, is non-existent.* If, as Darwin thinks, climate alone accounted for the fair hair and blue eyes of the Teutonic race, how comes it that North America, with similar climatic conditions, has never produced a fair-haired race [the Eskimos, for instance, are dark-skinned, with black hair]; and why are there in tropical America and Asia no Negroes?"

We see, therefore, how well-known savants, who can not be suspected of a leaning to Christianity, who ought, from their mode of thought, to be in sympathy with

Darwinism, unanimously reject it on the ground of scientifically-proved facts.

Wigand, the clever and able antagonist of Darwin, is once more coming into repute. Namann, Julius von Sachs, W. Haacke, and many zoologists, are falling away from Darwinism to such an extent that at the Congress of Naturalists, in 1897, Wilser made the bold statement, "He who is not done with Darwin hardly deserves to be called a naturalist;" and not one was found to contradict him. Science confesses more and more, with Dr. K. Müller: "It was a great thought of Darwin's to make all organisms evolve one from the other. Unfortunately, however, a glance at the fossil creatures of the various creation periods dispels this beautiful idea." (*Die Natur*, January, 1893.)

In the face of facts the theory is gradually becoming, like Hegel's philosophy, a thing of the past in so far as it claims to be a creation theory, and apart from the incontestable services which Darwin has rendered to science, though it will probably long be brought into the field by those who, for divers reasons, would be glad if it were true. The word of God, ten times repeated in the first chapter of the Bible, "Each after his kind," still stands firm,

And it is good that it is so; for the natural conclusions from such a doctrine are anything but pleasing. If man were once an animal, he may—nay, by Darwin's theory, he must—under changed and more and more unfavorable conditions—for example, a new ice-period—become once more an animal, and that long before the final "entropy" of the universe. Spiller's belief that the last men will be Equatorial Eskimos, has already been

noticed. Who can guarantee that, as the eccentricity of the orbits of heavenly bodies increases during thousands of years, and then as slowly decreases, evolution will not some day of itself take a backward tendency, and man return through the various forms to the primordial cell before the final end of the solar system? Professor Yung, of the University of Geneva, teaches "that according to the inexorable laws of the doctrine of evolution," men will, in consequence of the advance of industry on one hand, and locomotion on the other, in another thousand years possess longer and stronger arms, and shorter and weaker legs—will, in short, look very like monkeys.

If we picture to ourselves the further consequences of this doctrine, we see the man of the future as a very curious being. In a few thousand years, with natural selection, such as must result from continued evolution, there will be various races of men: humpbacked peasants, with enormous arms; large-headed students, with short-sighted eyes, which see only at reading distance, and shrunken legs; many-fingered pianists; postmen consisting almost solely of two long legs; porters broader than their height; and so on. A sad and eerie prospect!

We ask, however, if changes such as Professor Yung prophesies are to be expected in a thousand years, how comes it that during the lapse of several thousand years in India, with its strict system of caste, and in Egypt, where the trade or profession has descended from father to son through so many generations (which comes to much the same thing as natural selection), no new types of men have been formed?

Quite recently, since the above was written, the evolutionist and Radical leader, Clemenceau, has spoken clearly in the preface to his book, "La Mêlée Sociale," "He who says evolution, says curve. When the highest point is reached there remains nothing but the slow or rapid decline to unavoidable destruction." And he continues: "The hour of revenge for the lower nature upon the higher has come. Life, which began in a birth-hour of happiness, will end in the greatest misery. Nevertheless infirmity and the weakness of age will prevent mankind from feeling the full horror of its loss." And as sole consolation he holds out to man "the capability of dreaming, *le rêve!*" (Figaro, March, 1895.)

Every error bears in itself the germ of decay. We see the men who only a few years ago proclaimed triumphantly to the world that we are descended, not from God, but from an ape, now shocked and filled with gloom at the consequences of their own teaching.

The great mistake of Darwinism is the ignoring of the sacredness of individuality as a fundamental condition and the chief pillar of the creation. If this individuality be but the product of blind influences and natural forces, without a Divine idea as its immortal diamond kernel, the universe sinks ninety-nine per cent in value. No wonder that the materialist who consciously or unconsciously strives to underrate creation, nature, and to bring it down to his own level, greeted this unspiritual doctrine with sympathetic acclamation. But, pleasingly and seductively as it was propounded, it was never really beautiful and elevating. The belief that, according to Darwin, God, according to the materialist, primal matter, put life into a primitive cell, and then

left the poor thing exposed to all the chances of a blind struggle for existence, so that, according to wind and weather, heat or cold, damp or dryness, hunger or abundance, it developed, now into this, now into that form; and that a giraffe, in order to keep alive in a time of drought, stretched forelegs and neck till it attained its present shape—this doctrine of a chaos of possibilities, accidents, and exertions has never impressed me with its grandeur, and if it were true, we should have cause to mourn; for its spiritual results are terrible.

If God had not given each species a fixed and permanent existence, and if the organic life of the earth were to move in varying, changeable, ever-evolving forms, it would be a state of things more harmful to our spiritual life than if day and night, weeks, months, and years, summer and winter, size and weight of the earth, were indefinite and varying quantities; for our thought and our spiritual and intellectual life are inseparably bound up with the existences of creation. If the species is not unchangeable, then the rock on which our speech and thought is built, the substantive or *nomen*, shakes and crumbles. We have no longer any substantives, only attributes; and the immediate result is that gradually the temporary appearance is confused with the essence of the thing: noun and adjective are merged in one another, and become of equal value. With vagueness and uncertainty as to the boundaries of the single phenomenon language would become vague, hazy, indefinite, just as children and uneducated people call everything of which they have not a clear notion a "thing;" and the inevitable consequence would be that our thought, our intellectual life, would become indefinite, confused,

more and more worthless. The indestructibility of the species is the necessary condition of a healthy mental development. Its changeableness would mean the intellectual ruin of humanity. For that an animal should of itself acquire horns or a bushy tail would not, after all, be so very wonderful, and for the materialist, who believes that oxen butt because they have horns, quite natural. But for him who believes that the breath of God made man of the dust of the ground, and that the body is to this day the outward and visible sign of the indwelling soul, which requires eyes to see, as well as horns to push and claws to scratch, the question is not, whether the body, but whether the soul, the inward vital principle, with its qualities, its instincts, its characteristics, can so change that by degrees a rose becomes a nettle, a louse a bee or ant, a lamb a hyena, a turtle-dove a vulture, or, what is the same thing, that the soul of a rat could live in a nightingale, that of a swallow in a rattlesnake, that of a toad in a butterfly, or that of a lamb in a tiger.

What is the soul according to the Darwinian idea? A featureless and characterless, an immaterial but formless protoplasm, a substratum difficult to define; all distinctions between good and bad, pure and impure, talented and stupid individualities cease; that is, they are only passing wavelets on a sea of unconscious consciousness, have no permanent and consequently no real worth. This view pushed to its logical conclusion denies the continuance of individual existence, therefore the immortality of the soul.

When God had created everything "*after his kind*," he saw "*that it was good*."

The gradual extinction and death of the universe, the "entropy" of which we hear so much nowadays, is also founded on a one-sided and arbitrary explanation of certain facts. We see that in the sky there are suns of all kinds; some like Sirius, Vega, and Regulus, shining with a white light; others like our sun, Capella, and Pollux with a yellow, others again with a red light. We conclude from observations, therefore from facts, that the last class contains more variable suns than the first; the probability is that these red suns were once yellow, and earlier still white; but are now gradually going out; and we ascribe their changeableness, partly at least, to a gradual formation of slag on the surface. But to make from this a statement that all the suns in the sky were at one time white, that all of them, ours included, will one day become red and colder, and that from this may be deduced an eventual refrigeration, a death from old age of the whole universe—a thought which implies either that there is no God, or that God will find himself unable to keep his creation in life, his power in circulation, will in short become bankrupt—is to put an interpretation on facts which outstrips the facts themselves, and all for love of a theory.

According to Flammarion there does not appear to be a single bright star missing from among those in the list left by Ptolemy. If within recent times seven stars have disappeared from the sky, burnt out, extinct, dead, thirteen new ones have made their appearance; if some have become redder, others have grown whiter. The beautiful star, Capella, appeared red to Ptolemy. At present it is of a whitish yellow, and has increased so much in brilliance that it now outshines Vega. The

star 6 in Perseus has in the short space of forty years changed from red to white, and the double star 96 in Hercules, which was at first green and red, is now white. But in Sirius, that gigantic sun, which is probably five thousand times brighter than ours, we have, according to the clear and unanimous testimony of Cicero, Horace, and Seneca, a striking example of a sun once red, redder than Mars, and now a brilliant white. It has, therefore, within a very short time—for what are two thousand years on the dial of heaven?—and from causes unknown, increased several hundred times in light and heat, with which increase there was probably connected a corresponding augmentation of brilliancy and vitality in its planets and satellites. All the suns in the heavens are not, then, losing in light and heat, but many, perhaps most of them, are growing in both, we know neither how nor why.

This shows that the “entropy” of the universe has no foundation in fact, but is only an arbitrary, if, to many, possible interpretation of certain isolated facts. Supported by other facts, we can reply with justice to the believer in this theory: The universe is not tending towards impending extinction, but towards a fuller and more glorious life through increase in force and light and heat. Yet, considering the brief space we have had in which to observe the starry heavens, that, too, is a hasty assertion unwarranted by facts as they at present stand.

In studying science, then, the principal thing is to learn to discriminate between fact and explanation, to revere the positive fact, to test the explanation given. Where a reasonable, probable explanation, covering as

far as possible (for none ever does so entirely) all the facts, is offered, accept it thankfully; but beware of the present craze for explaining everything. Why not when asked, "How do you explain that?" answer candidly: "I do not explain it at all. I study the facts, and wait." The more learned the man, the better he knows how little it is really possible to explain.

* * *

In the third place, their dislike to science in general is due, on the part of many Christians, to a one-sided view of the great truth that God is no respecter of persons, and that he gives his Holy Spirit to the ignorant and babes, as well as to the sages and wise men of this world. Without wishing to take one iota from the saying of Christ, "I thank thee, O Father, Lord of heaven and earth, because thou hast hid these things from the wise and prudent, and hast revealed them unto babes" (St. Matt. xi, 25), we would earnestly beg the reader to bethink himself how God, in order to carry out his great purposes in the world's history, did not choose ignorant men who cared nothing for knowledge and science, for human skill and learning, but honored with his friendship and communion and inspired as writers of his Word those who, like Abraham, were princes of the people and associated with kings; who, like Moses, were instructed in all the wisdom of the Egyptians; like Job, whose utterances are full of the deepest knowledge of men and nature; like David, who composed unrivaled hymns and odes on the subject of nature; like Solomon, who "spake three thousand proverbs, and his

songs were a thousand and five. And he spake of trees, from the cedar-tree that is in Lebanon even unto the hyssop that springeth out of the wall: he spake also of beasts and of fowl and of creeping things and of fishes" (1 Kings iv, 32, 33); like Daniel, of whom it is written: "Daniel was preferred above the presidents and princes, because an excellent spirit was in him; and the king thought to set him over the whole realm." (Dan. vi, 3.) When Christ speaks in the above-quoted passage of the wise, he means, it is clear, the wise of this world, those who think themselves wise; that he does not mean the wise in God is shown by the fact that not only the shepherds but the wise men from the East came and paid him homage. They offered to him gold as King, frankincense as the Lord's Anointed, and myrrh as symbol of his bitter sufferings—all of which they foresaw by means of their wisdom; for they were astrologers, or, more correctly speaking, astrosophists, and read in the stars more things and greater than Laplace in his "*Mécanique Céleste*." Finally, as his instruments for preaching the gospel to the heathen, and for doing the greatest work of all, God chose St. Paul, who was better instructed in the learning of the scribes than all the other apostles. And similarly we see how, since then, all the leaders of Christendom, the true princes of the Church and spiritual pastors of mankind, the fathers of the Church, the reformers, Augustine and Luther and many others, were by no means uneducated and ignorant men; but, on the contrary, so many-sided were they that, to use the words of the Roman poet, nothing which could interest mankind did they count as strange to them. Of them we may confidently say, that did they live to-

day they would gladly avail themselves of modern science to proclaim aloud their belief in a wise and Almighty God and Creator of the universe, as the infidel uses it as a text from which to preach a godlessness which lies not in it, but in himself.

Let us, then, beware of drawing too great a distinction between the Holy Ghost and the Spirit of God, which enables us to attain knowledge and which also is holy; in other words, between the inner and the outward life, as if they stood in opposition to one another. The earnest study of nature in a God-fearing spirit of mind does not lead us away from God, does not weaken faith, does not cloud the eye of the soul; on the contrary, he who has brought God and nature into unison in his heart, thanks God daily for it; the disputes and contentions of men of science do not affect him, even though he is obliged to confess that there is much he does not understand. Everywhere he feels himself surrounded by the power and might of God's love, in air and wind, in spring and brook and sea, in stone and plant and animal; all are to him eternal thoughts of God; he rejoices that, even with his purblind eyes, he is able to recognize something at least of the marvels of God's creation; he rejoices in the hope of one day attaining to the true universe, true nature, where true light and true matter, true life and true forces, true unity of all being, and true forms, constitute a true and eternal creation, the understanding of which will be our appointed task, and for the glory of which we shall praise God to all eternity.

It is owing to this exaggerated distinction between the Holy Ghost and the Spirit of God that there arises with many Christians a supposed conflict between sci-

ence and miracle. On this point there is a want of clear thought and calm reflection. Why not look upon a miracle as that which it professes to be, as that apart from which it would be no miracle—as something happening outside the limits of the known laws of nature, be it an occurrence in obedience to higher laws, be it an arbitrary and supernatural intervention of God. From this simple position with regard to a miracle, and this definition, which is contained in the Word itself, two things follow: First, the absurdity of denying it. To maintain that no miracle has ever taken place, that such a thing is impossible, is nothing else than to maintain we know all the forces and laws and possibilities in the universe! For four thousand years we have noted and investigated so thoroughly every single fact in the life of the individual and of the nation, every phenomenon of nature and the universe in general, that we are able to determine what is possible and what impossible. During this brief span of time we have been able to draw certain and infallible conclusions as to all that has happened and ever will happen. We see at once what foolish presumption that is. For, as Maudsley remarks, "It is the presumption of human ignorance to hold that a thing is impossible, simply because it seems to us incomprehensible." Science is not, and never will be, in a position to decide with infallibility what can and what can not be. Therefore the possibility of a miracle, as something apparently incomprehensible, is not to be denied. The old discussion as to whether it results from the operation of laws unknown, or from a direct and sudden dispensation of God, is for us idle and unprofitable. We know of no laws of nature which, once set in

motion by God, now work independently like a clock constructed and wound up once for all. What we, for the sake of brevity and convenience, call natural forces are really a continual exercise of the power of God, an emanation of his will, as in Revelation iv, 11, the celestial choir sings, "Thou hast created all things, and for Thy pleasure they are and were created." If it pleased God to withdraw this second into a state of inaction as regards creation, the universe would melt away, and the forces of nature would cease to exist. In so far there is for us nothing which can, strictly speaking, be called natural, all is divine; and we might just as well say every form of existence is a miracle, as that there is no such thing as a miracle.

The second result that follows from the above definition of a miracle is the impossibility of scientifically disputing it. A miracle is altogether outside the province of scientific criticism. This was acknowledged by the great scientist, Tyndall, who was by no means a believer in the Bible, yet admitted that if there is a God he is almighty, and can therefore work miracles; and that miracles, if there is such a thing, have nothing to do with science, but lie outside her province. Quite true, we say, and would recommend this utterance of a man of the first rank to those of tenth rank who delight in confronting miracles with science—a proceeding much like shooting at the sun with a revolver, and thinking if only the weapon were more perfect we should hit it. Many understand by the saying that science has done away with miracles, the fact that it has taught and is constantly teaching man that what he took for a supernatural occurrence is, when looked at by the light

of science, quite natural, and, it is added by superficial men, quite simple. No doubt the Indian who first saw the locomotive rushing over the prairie whistling shrilly took it for a supernatural being, a terrible monster. Science, in the person of the mechanic, can make clear to him the facts of the case, how by boiling water steam is produced, which sets the engine in motion, etc., thus relieving him of his superstitious fears. One of the uses of science is to explain the conditions under which phenomena take place, and that is as it should be. But does any one imagine that after this explanation the Indian and the mechanic were any the wiser as to why heat generates steam and exercises force, or as to what heat itself is? Do you believe that the foremost electrician of Germany knows what electricity is? No! and the greater he is in his profession, the more ready and willing he will be to confess the fact. The locomotive, that marvelous combination of matter and force, is to the intellectual man a far greater marvel than the supposed monster is to the ignorant Indian.

The very essence of a miracle is its intangibility by proofs and reasoning, its incomprehensibility and its incapability of being proved. He who tries to understand and to explain a miracle, to comprehend or to fix such a flash of illimitable, Divine power, shows that he does not know what a miracle is, and in his attempt to explain it only succeeds in making a fool of himself, both from the scientific and the Christian point of view. A miracle scientifically proved and explained would be a logical contradiction. No zoology, however advanced, will ever be able to prove that Balaam's ass was not miraculously endowed with speech; no physics, however deep and

highly-developed, that the three men were burnt in the fiery furnace; or that Christ must have sunk when walking on the sea. For even a child must have recognized that these things were contrary to nature. He who allows his belief in miracles to be reasoned away, or even shaken, by professedly scientific arguments, is, to say the least of it, sadly lacking in perspicacity, and would do well to test his conception of an *Almighty* God, and find out what he really does believe. God is miracle, and he who does not believe in miracles does not believe in God, even though he believes that he believes in him; that is to say, he is mentally too weak to grasp both. A miracle can not be grasped by the intellect any more than a sunbeam can be grasped with the hand; it must be seen by and in the spirit. For this reason small natures have in all times been inclined to ridicule the idea of a miracle just because it goes beyond their horizon, while in all ages and nations there have been great, deep-thinking, and clear-sighted men who have believed it; hence the proverb: All great men are superstitious! The question does not by any means depend on whether you can believe any special miracle, such as the translation of Elijah, or Christ's walking on the water. A miracle is as little to be explained as the fact of existence; it is, or it is not. If it is, if to-day or to-morrow, or in ten or a thousand years, something may happen which is not in accord with my slight experience, with my imperfect knowledge of the laws of the universe—which is, or appears to be, in direct opposition to them—then all at once any miracle becomes possible, to-day, yesterday, or to-morrow, whether it be the sun standing still in the sky without any consequent dis-

turbance in the solar system, or a poor child finding a penny in the dust in answer to its prayer. We who believe in a God, believe of necessity in a miracle, for a God who was obliged to obey self-made laws of nature with regard to the manner in which he reveals himself in his creation, would not be a God at all. Among men we see often enough how a man of little mental ability will see only one way out of a difficulty, or perhaps none at all, while a clever man will find a dozen excellent ways and means. Man knows only one best; God an infinite number, because he is Infinite Good.

There are sundry facts which it is well to note in connection with the miracles recorded in the Bible. First, that they are done to the honor of God, and for the weal and blessing of mankind. (The one exception is the withering of the barren fig-tree as a symbol of the rejection of Israel.) The miracle has a moral purpose and an ethical value. Secondly, the miracle is not an arbitrary sport of God, but has an aim and a purpose, and, unlike the wonders of the fairy-tale, occurs in accordance with natural analogies and principles. We do not find organic leaves changed into inorganic gold, nor the drops of blood which fell from the Divine brow in Gethsemane becoming precious stones, nor man changed into an animal. Thirdly, the miracle is always an amplification and elevating of life, and answers to the secret yearnings of man, to the strivings of his science. Bread is food, and our scientists to-day aim at manufacturing food from inorganic material. Christ increases its nourishing power, and feeds thousands with a few loaves. Man was created for health and everlasting life; and the aim of science is to abolish disease, and

some say death; Christ heals the sick and raises the dead in pledge of future health and immortality. Man was created lord of the elements and forces of nature; we seek to invent flying machines and annihilate space; Christ walked upon the sea and ascended into heaven from the Mount of Olives.

Many people do not see the necessity for a miracle. It is true God does not need them; he does not perform miracles for his own sake; for him there are no miracles; the creation of a new sun or the birth of a worm are the same to him. But for our sakes he performs miracles; for our sakes, that we may not be led to worship God as nature, nor nature as God! God works miracles in order to show himself another and greater than this nature, and to say to every one not spiritually blind: "I am in nature, but I am not nature. I am its Creator, and since I created it voluntarily, I can at any time arbitrarily alter it." Miracles are done as a "sign," the name by which they are called in the Bible. That is the logical ground of their performance, at the same time a concession to the unbelieving. "Except ye see signs and wonders ye will not believe." And because the miracle shows us a God always present, always ready to intervene for his honor, for the help of his people, sometimes for the judgment of unbelievers, there is no fact or phenomenon of the world's history which the devil combats with such zeal, even though with wonted inconsistency he encourages his followers to believe in the coarsest of wonders, such as spirit-rapping and fortune-telling.

Nature itself teaches us to believe in the supernatural. In the mineral kingdom the plantlike ramifica-

tions of the crystals of gold and silver, and the fairy frost-flowers, point to the plant; plants which move and which feed on flesh are indications of the animal world; the barking of the dog and the singing of the bird predict the human voice; and man himself is a foreshadowing of the angel or the devil which he will become. The sense of the supernatural is born in man; the child lives in a world largely made up of the supernatural element. This fact ought to be proof sufficient for him who accepts the words of Christ, "Except ye become as little children, ye shall not enter into the kingdom of heaven." It is, however, easier to believe in the supernatural in general than in the miracles of the Bible, for between the two lies the great difference between theory and practice. Numbers of people who have no difficulty in believing that long ages ago God created the world, would think it very strange if they were told that God has this morning created a grain of sand. And others who grant the existence of a Supreme Being somewhere very far off, would smile if I told them that this Supreme Being had this morning answered my prayer. They can put up with the supernatural; that belongs to philosophy, almost to science. But to believe in miracles! Think of all it means, think of all it leads to!

Man can not get away from miracles; even the materialist believes in them. Not in those, it is true, which happened eighteen hundred years ago, and to which many trustworthy men bore witness, more than one of whom sealed that witness with his life; but in such as happened millions of years ago, which were observed by none who could testify to their genuineness. That he may not have to believe in a creation he believes in

an unproved spontaneous generation, or imports at great expense life-germs from other worlds. That Christ raised the dead, made an organism which had lived live again, he does not believe; but he does believe that organisms were generated by dead matter. That God for a special purpose endowed an ass with speech, that it spoke certain words, is too absurd to be believed; but that an ape, without knowing why, gradually began to talk, and that all the asses in the world will one day speak is, or ought to be, seriously believed by those who hold the doctrine of evolution. That God, the Creator of fire and of men, should have made three men fire-proof for a few minutes seems to them a ridiculous legend; but they believe that organic germs existed for millions of years in the glowing cosmic gas and in molten granite. Nay, even a scientist like Tyndall believes that all life-germs, the inventive faculty, reason, and will, in all their manifestations were once "latent in a fiery cloud!" If that is not a miracle, what is it?

The noted French theologian, Professor Sabatier, writes, "The theory of evolution renders the miracle unnecessary." Does this theory then explain the wonder of wonders, the origin of all things? Whether God creates afresh each midge and each elephant, or whether he once upon a time created a primordial cell bearing in it all the germs and powers of evolution, so that it reached its present stage of development under the influence of times and circumstances—which are also the work of God—the sum of miracles remains precisely the same, and in both cases amounts to nothing more nor less than the creation of all organisms.

Neither does the creation of a primordial cell exclude

the possibility of a miracle at any time. If God once created such a cell, he can create another to-day or to-morrow; or are we to suppose that since then he has forgotten how? If he could create one, he can create a hundred, a thousand, a million; then he can instantly—or is a certain time necessary?—create all those necessary to the reviving of a dead man, and to the future resurrection of the body—there is the miracle again! Let us deny God altogether, and say: The primordial cell created itself. But alack! here we have something as much like a miracle as one pea is like another!

We finite beings move in infinity; infinity is a miracle to the finite creature, because it can not be grasped and comprehended by our thought. Because we live, move, and have our being in this infinity, our whole existence is built upon and bound up with the miracle. The soul is a miracle; all its yearnings are after something greater and more lasting than this visible creation. This is overlooked by those benevolent and charitable souls who seek to regenerate the world by means of philanthropic societies; for even if their laudable endeavors succeeded beyond all expectation the world would not become paradise, nor the soul of man be satisfied and at rest. For this breath of God will be satisfied with nothing less than divine power, divine wisdom, and the wonders of the Divine. A miracle unfathomable, never to be unriddled, is the origin and growth of man in his mother's womb; a miracle his life as an inexplicable union and interaction of spirit and matter, soul and body; a miracle his eating and drinking, and incomprehensible the fact that the piece of bread which was this morning lying upon the table is now feeling pain, will-

ing and thinking in me, as flesh and blood and brain. And as life is a miracle, so also is death!

Even the skeptic Tyndall writes: "Preoccupation alone could close the eyes of the student of natural science to the fact that the long line of his researches is in reality a line of wonders. There are freethinkers who imagine themselves able to sound with their penny twine-balls the ocean of immensity." (New Fragments, page 387.)

Looking at things in their true light, we swim in miracles as a fish in the ocean, and what we call a "miracle" is only the, to us, unaccustomed falling of a few raindrops into this infinite and fathomless sea. Instead of the common saying that stupid and superstitious men look upon natural things as miraculous whenever they do not understand them, we say with more truth: Stupid and superficial men consider miraculous things quite simple and natural because they flatter themselves that they understand them. For the miracle is an essential part and element of all existence (so-called "chance" for example), and not one earth-born being can affirm, "I understand, I comprehend, I have mastered it," of one atom in the great All! Take refuge in the notion of eternal matter; hide yourself in eternal darkness; here, too, the miracle confronts you, an image of the omnipresent God, from whom it is impossible to flee.

The innate and unconquerable liking for the marvelous; fairy-tales, for example; the horror and delight in it which all men have experienced,—shows that the marvelous exists. But as the king's son stolen in infancy and brought up as a swine-herd, laughs incredulously when he is told how rich and powerful his father is,

how he himself will one day have millions at his disposal, rule over mighty armies and a multitude of servants, so many men live in such a state of mental inertia and weakness of nerves, that they put down with a fatuous smile anything marvelous to swindle and deception, because they are no longer capable of rising above the dead level of the commonplace. Every Divine miracle (there are Satanic miracles too) is a spiritualization of matter, a release from the bonds of so-called natural laws, a lightning-like transportation into the realm of eternal nature, an emanation from and a proof of a higher, fuller, richer, and freer world. So it was when Christ walked upon the water, raised the dead, and healed the sick; for man was created that he might be superior to the elements and forces, subject neither to disease nor death.

To the scoffing objection that the miracle will not bear the light of science, we answer: It certainly is so. But as the tender root on which the life of the plant depends works only in the depths, in silence and darkness, drawing life from death; as the heart of man hidden in his body distributes life incessantly to the whole system; as both laid bare upon the dissecting-table stand still and refuse to give up their life-secret; so the miracle, which has its root in the deepest depths of the soul, is dumb before the gaping crowd, and demands faith in him who performs it and him who witnesses it. "He did not many mighty works there because of their unbelief." (St. Matt. xiii, 58.) Sympathy and interest attract, hostility always paralyzes and kills; that is an eternal spiritual law. Every orator, actor, poet, and artist knows how he is either paralyzed by the coldness and ridicule

of audience and spectators, or electrified and inspired to highest performance by sympathy. The strong, faithful prayer of the children of God rises to heaven and moves the Godhead to rain down wonderful answers, overleaping all the hedges and bounds of calculating reason, a fact as unintelligible to the believer as sight and color to the blind. The miracle has this in common with all that is high and glorious, that it requires a peculiar sense for its perception. He who approaches the Father of spirits with repentance, self-denial, and strong, unwearied supplication, raises himself by degrees to that world where the miracle is native; he who keeps his eyes fixed on the earth, seeking only after money, ease, and pleasure, gradually becomes blind to the higher life; the sense of spiritual vision weakens, and is eventually lost till he sees in the highest and deepest things, in the true and the beautiful, nothing but deceit and humbug! A terrible retribution!

But we are told miracles never happen nowadays. How can you be sure of that? Who is to say that yesterday or to-day, in answer to the prayer of faith, God has not miraculously preserved some one from death or danger. The lives of Francke in Halle and Müller in Bristol could testify to many miracles; and many a Christian could tell of such in his own experience if he would. But those things are not to be proclaimed to the world; they are kept in the heart. The tidings of a miracle have never spread throughout the world; the occurrence has always been related as natural or as a legend. When Pharaoh and his host perished in the Red Sea, it was told in Egypt that they had been caught in the quicksands and drowned in the sea; the miracles of Christ created

no sensation in Greece and Asia Minor. Secondly, "there is a time for everything," as Solomon says, and also for the miracle. The Bible tells of no miracle performed during the fifteen centuries before the Flood, except the translation of Enoch, which was not public. Thirdly, the Bible teaches that from the call of Abraham God reserved the working of outward and material miracles for his peculiar people. For the last eighteen hundred years he has rejected them, and is deaf to their prayers. For those who know their Bible the era of open miracles ceased with the destruction of Jerusalem. To work miracles in the sight of the degenerate Christendom of to-day would be to cast pearls before swine, and would only bring greater condemnation. It is said even of the Jews in the time of Christ when they saw his miracles, "They were all amazed, *and glorified God.*" Would that be the effect of a miracle worked to-day in the streets of Berlin or Vienna, Paris or London?

Yet even in the present day the God of miracles is not inactive. He is gathering together out of all nations an invisible Church, to whom he promises not earthly possessions, but heavenly treasures. It is in harmony with these promises that, instead of granting to his Church miraculous victories, the drying up of rivers, and the fall of cities, he now works spiritual wonders. By day or by night, in field or in workshop, in the hurry of life, he seizes on one and another, turning his heart so that he loves what he hated, and hates what he loved; so that the world becomes a shadow, and the heavenly kingdom alone appears a reality; so that at last he dies full of joy and confidence, while the world looks on death with horror. Is not that a miracle?

One might cry to many of the educated class to-day, How long halt ye between two opinions? If the Lord be God, follow him; but if Baal, follow him! They coquette with unbelief, and yet hesitate to throw religion overboard. They accept the fact that there is a God; but not, of course, the human conception of God as set forth in the Bible. They talk of a "Supreme Being," of a "merciful Providence," of a "kind fate;" the Bible and Biblical miracles raise a smile of superiority; the account of the Creation and the Fall are venerable traditions, betraying highly primitive ideas; nevertheless they have their children baptized into that faith, taught and confirmed in the belief that all these are divine truths. They are unpleasantly affected by the doctrine of repentance and conversion; but also by the materialistic notion that "faith, hope, and love are nothing but chemical products!" They take in papers and magazines of a religious character for their children and servants, but enlightened periodicals which secretly or openly make a mock at true Christianity also. In the morning they listen more or less attentively in church to the most uncompromising of preachers; and in the evening to a popular lecture on science, in which it is proved that the story of the Creation and the Deluge are legends and myths. In short, they shrink from the candid, consistent carrying out of a principle, from any mental struggle; they desire to figure as enlightened Christians, as a dark light, or a cool warmth, and, with all their tolerance, good intentions, and charitable whitewashing, succeed in being men in whom neither God nor the devil can take any pleasure.

The consequences of this lack of character are ter-

rible. It is not a Nero, not an Attila, not the greatest criminals, enemies of God, and anarchists, who demoralize the world; they in a way produce good by being consistently wicked and acting as a warning. For every clear manifestation of a principle is salutary. If the devil were to appear on earth in visible form, and exactly as he is, his very adherents would fall away from him. He knows that, and hides himself.

The present social disintegration is chiefly due to the middle and upper classes, who serve as example to the lower orders; who think themselves and wish to be considered their betters. The workingman and the out-cast both see and feel how, with all their piety and respectability and polish, a want of principle and a comfortable egotism are the foundation of their existence, and how the one aim of these nominal Christians consists in making themselves as warm and comfortable as possible in this life, in direct contravention of their Master's Word. Much as this desire clings to us all, a life which has no other aim is despicable and worthless; for the animals, too, wish to live as comfortably as may be. The most honest course would be to drop a hypocrisy which deceives neither God nor man, and confess candidly: "I live in this world, for this world, and with this world; but as a precaution and from cowardice I should like to leave a back-door open in case there really is something in the Bible and religion, the day of judgment and eternity."

Let us aim seriously at certainty and consistency especially in the matter of religion; for in this, as in nothing else, half-heartedness and hypocrisy paralyze and poison the whole life. That is an awful utterance:

"I would thou wert cold or hot. So then because thou art lukewarm, and neither cold nor hot, I will spew thee out of my mouth."

Many may say with regard to the Christian study of nature which I have recommended: "My business, my profession does not allow me time to think about such things." He makes a great mistake. We expect of a master in any trade—nay, we require of him by law—that he should not overburden his apprentices with work so that they have no time left for their mental cultivation. Does God, the great Master, take less care for his apprentices, and, while giving them time and opportunity to earn their bodily food, withhold it as concerns their spiritual sustenance?

When one thinks how St. Paul, a tentmaker, found time to evangelize the world, how a shoemaker like Jacob Boehme, a ribbon-weaver like Tersteegen, a tinker like John Bunyan, while working diligently at their trade, produced spiritual nourishment, not only for their own benefit, but for that of thousands, one must confess with shame: It is not time we want, it is the will! O that our motto were, "Excelsior!" For heaven is high, and many who would fain get there will learn to their cost that God is high! We can not reach him by grubbing day after day, week after week, in the dust of earth, and by incessant care for the things of this world, nor even by working diligently, earning an honest living and saving for our children, laying up to insure for ourselves and them a life free from anxieties! That do also the heathen!



Let us now review briefly what the Bible tells us of nature.

It does not begin with the Fall, and the promise of redemption; for great and deserving of gratitude as this is, God did not create man in order that he might sin and be redeemed. Majestic are the opening words, "In the beginning God created the heaven and the earth." We pass through this gate of rock from Eternity into Time. These are the Hercules' pillars of human thought, beyond which rolls the infinite, unfathomable sea of the Blessed Godhead. When God becomes once more all in all, and we in him, we shall know what moved him to step out of his eternal rest and self-sufficiency to beget the Son, and to create all things in and by and for his First-begotten. But as long as we remain in this mortal body, it is better for us not to attempt to understand these things, for, says Jacob Boehme, "that troubles the soul." Yet pause here and think, thou wanderer through the ages; for the way parts here to right and to left. If these first words are not true, throw your Bible aside; it begins with a lie! But if there is a beginning, a God, a heaven, and an earth, then the Bible is true up to the last word concerning the new heaven and the new earth. You are a Christian, or you are not! There is no middle way; balance as cleverly as you may on the tight-rope your life long, at the hour of death you will fall to the right or to the left.

"In the beginning," thus all religions and cosmogonies commence. We shall see that this expression is even scientifically more justifiable than the eternity of matter. After this great utterance the Bible turns to

the earth. God might have given us an account of the heaven of heavens, of angels and archangels, cherubim and seraphim, thrones and principalities; and let us know how and why Satan fell, drawing legions of angels after him, and also what numberless miracles God has wrought by his mighty Word upon the millions of other worlds than ours. But had he written it in heavenly language we should not have understood it; related in an earthly tongue it would have excited in us insatiable questionings, and have drawn us away from the salutary contemplation of our nothingness, our sinfulness, and our need of redemption. Because the Bible speaks to the inhabitants of earth, it speaks a human and earthly language. It speaks of the sun as rising and setting, as we all do, even the greatest astronomers, although, strictly speaking, it is not the sun that moves, but the earth. Herschel, Arago, Mädler, all speak in their books of sunrise and sunset; for the language is properly used of the appearance, without reference to the actual law. Or ought God to have given us, besides the Bible for the people, a scientific edition? From what scientific standpoint, then? From that of Ptolemy, or of Copernicus, or from that of the year 2000 or 3000? Or in accordance with his own absolute knowledge, thus making the book unintelligible to us all? The Bible is not intended to give us an explanation of the Creation, its aim is to show us God in creation.

After the opening words the Bible passes on to a description of the Creation in grand yet simple style, "The earth was without form and void, and darkness was upon the face of the deep." This is in entire conformity with science. Over a hot granite crust a glow-

ing ocean, and beyond that an impenetrable atmosphere rich in carbonic acid. But at God's Word it becomes light! The atmosphere cools, the particles of vapor pour downwards, and the earth swims in a sea of light without night; in and through the primitive nebulosity of the universe perhaps, such a nebulosity as we see in the vault of heaven. It would be unscientific to deny the possibility of it. "And God said"—and the atmosphere clears still further, becomes air, "a firmament to divide the waters from the waters," an apparently insignificant fact, and one which is mentioned in no other cosmogony; and yet of what infinite importance! Ask all the men of science why the earth is not, owing to constant evaporation, enveloped in an impenetrable fog, hiding the sun and making all study of the heavenly bodies an impossibility. Instead of that, high above us soar the clouds driven by the winds, and descend to water the earth. A tremendous circulation of the waters, important as that of the blood in the body, makes possible the existence of this "expansion," as the Hebrew has it, the firmament, the air. Unseen, day and night, whole Amazons and Mississippis are drawn up to the heavens, and fall again, disintegrating the mountains, forming Holland of mud carried down from the Alps, the South American plains from the *débris* of the Cordilleras, smoothing and leveling; but the subterranean forces, too, are continually at work, mountains are rising and seas sinking.

And the evening came on—for even then "God called the light [the light-time of whatever length it might be] Day, and the darkness he called Night." (Genesis i, 5.) In this fifth verse we are clearly given

to understand that God is not restricted to any particular length of day; the days are simply epochs of light interrupted by periods of darkness; the Bible says nothing as to their duration, and we have instances enough of the use of the Hebrew word, *yôm*, to express an indefinite space of time (Genesis xxv, 33; Isaiah ii, 17, 20, etc.) After a long day of light the volcanic forces of the deep broke forth, like the eruption of Jorullo in Mexico (1734), and of late years the sinking of Krakatoa near Java, only much more violent; and enveloped the earth in long-continued darkness, completely in accordance with science. Then God said, "Let the waters under the heaven be gathered together, and let the dry land appear." And two worlds arose, two contrasts as widely different as day and night, the height and the depth. What lives in water dies on land; what lives on land dies in the sea. "And God said, Let the earth bring forth!" The Word, the Logos did it, not atoms and the forces of nature; they know nothing of life; how should they be able to bring it out of death? And on the new-born land sprang into being all kinds of plants in the hot air, so rich in carbonic-acid gas; thick forests full of a rank, luxurious vegetation, araucaria, calamites, tree-ferns, those of our coal-deposits. The universal distribution of these plants even to the Poles is a proof that the temperature of our globe was at that period uniform, the source of heat being other than the sun, which was as yet uncreated. Cuvier, the founder of palæontology, says in his "*Discours sur les révolutions du globe*:" "Moses has left us a cosmogony the exactitude of which is more wonderfully confirmed with every day."

It is ridiculous pedantry to charge the Bible and Moses with inexactness and falsehood because in fixing the chief events of the Creation he omits to mention in connection with the creation of a great world of plant-life the marine animalculæ which also lived at the time. As if he were obliged to furnish a minute catalogue of all the organisms; or as if I were saying what is untrue when I write, "In the time of Tacitus great forests of pine and beech covered the greater part of Germany," because I omit to mention the snails on the tree-trunks and the tadpoles in the puddles. Professor Quenstedt, although no Christian, says admiringly of the Biblical account, "Moses was a great geologist, wherever he may have obtained his knowledge," and "The venerable Moses who makes the plants appear first has not yet been proved in fault, for there are marine plants in the very lowest deposits." As to the creation of the sun on the fourth day (the Bible uses, by the way, not the word "*bara*," created, when speaking of the sun and moon; but "*asah*," prepared), he exclaims: "How true! for the tiny earth must have taken form long before the gigantic sun." (Die Schöpfung, pages 8 and 27.) Whether he is correct in his interpretation of the matter is a subject we can not go into here; but at any rate his words show that one may be a great and learned geologist and student of nature without considering it, as so many smaller minds do, their duty as scientists to shrug their shoulders contemptuously at the Bible story of the Creation.

Once more fiery forces broke forth from the deep, enveloping the earth in night and darkness; new mountains were upheaved, the depths sank; till at length all

was still and light appeared again. "And God said, Let the waters bring forth abundantly the moving creature that hath life, and fowl that may fly above the earth!" And to this day the waters bring forth in such abundance that it almost seems as if there were grounds for fear that the life of the ocean may become excessive. At this time came into being the great sea-monsters, the millions of saurians or lizards which are found as fossils in the Jurassic strata.

And when, after another long night of dreadful disturbances, the majestic word of Creation once more resounded, all kinds of quadrupeds and the present trees made their appearance; and after these—this time without a night intervening, another geological truth—man, created in the image of God.

Criticism is powerless to overthrow this cosmogony. He who denies that, in agreement with this Word, first the deep, the ocean, covered the earth, and darkness was upon the face of the waters; that then the first continents and mountains rose from the depths, followed by the appearance of a colossal vegetation and millions of marine animals, later by a world of quadrupeds, and, last of all, by man, *denies the Bible and geology*.

Man was made to live in the midst of this divine creation, rule over it with divine power, and raise it to God. "Of every tree of the garden thou shalt [not mayest] eat." Is it, or is it not, true, then, that man is the lord of creation? Is not the fear and dread of him upon every beast of the earth and every fowl of the air? But is it not true, too, that he feels himself to be a fallen creature, and is afraid because he is naked?

And now the Bible goes on to present to us hu-

manity in the closest connection with nature. Because man fell, the ground was cursed for his sake; and yet from it he must derive his nourishment until the day when he once more returns to the earth, of which he was made.

When the waters above the firmament and the waters below, separated one from the other by God's wisdom, had once more flowed together by reason of men's sins, drowning mankind, God cursed the tower and the city, and caused the instruments of his will and his spirit—Abraham, Isaac, and Jacob—to live in the free air of nature, worshiping him, and growing in spirit on the mountain, in the oak-grove, and under the palm-tree by the fountain. Oriental nature—monotonous, but grand in its monotony—formed the background to their spiritual life. Moses, the greatest of the prophets, the special friend of God, after his studies at the court of Pharaoh were ended, was sent to Mount Horeb, where he spent forty years amid surroundings grand in the extreme: sea, desert, and mountain. Here he remained, strengthening himself in spirit, and returning to a natural state of mind preparatory to God's laying upon him his great mission. In this same wilderness of Sinai he educated the people whom he was to lead into a land flowing with milk and honey.

Great is the view of nature taken by the law uttered on Sinai; in fact, that law rests upon nature as its foundation. Israel is not to be a manufacturing or a commercial nation, not a race of hunters or fishermen, not a nomadic tribe, but, in the truest sense, a people of nature. They are to live in and with nature, by God's blessings given in nature and her fruits; they are to celebrate

their festivals in harmony with nature; they are to offer to God the firstfruits of a nature created and sanctified by him; nature is to have her Sabbaths and years of rest and jubilee; they are to deal with her justly and considerately throughout—and as a reward for their obedience God promises his choicest gifts: corn, oil, and wine and fertilizing rain. Here we have the ideal of a nation—beautiful because healthful, healthful because natural, and natural because divine.

The reverent carrying-out of this relation of man to nature in the Jewish traditions has a beneficial and elevating influence. Beautiful is that reverence for the “shadow of Jehovah,” as they call creation; beautiful the recognition of the two principles underlying everything in nature, the clean and the unclean, the fear of marring the divine “Zurah” (form) in any creature, or defacing it by force, or artificial breeding, or mingling in any way; beautiful the belief that every such disturbance of the earthly nature is an obscuring of that which corresponds to it in the higher nature, and that it causes grief to the angels because in that way their power to work in nature for the honor of God and the good of mankind is weakened.

On this natural basis the law builds up the divine and human right which lies hidden in nature; for nature and law are one. First, it affirms that the creature, like the creation, stands before the Creator, and must walk in his ways. Theocracy is the natural form of government; for, if God is the Creator and Preserver of the universe, he is also its King; and to him are due highest honor and perpetual worship, and his service is the object and the happiness of existence to his crea-

ture. Wherever he may be, by day or by night, at home and abroad, the Israelite is in the sight of Jehovah, the holy and jealous God, who does not hold the sinner innocent. Of that he is reminded every moment of his life by the terrible law, with its inexorable sentence, "That soul shall be cut off from among his people." The highest dignity to which man can attain is the service of God.

The seventh part of his earthly life belongs to God. The plow, the sickle, and the wine-press, the servant and the maid, the ox and the ass, are to rest for twenty-four hours. Woe to the man who even gathers sticks; he shall die. There is a pause in all human work and dealings between man and man; the creature stands inactive before the Creator. How pregnant with meaning!

The service of the tabernacle is deeply symbolical. Outside in the desert of the world stands the multitude. The chosen people enter through fire and water, between the brazen laver, which washes away uncleanness, and Ariel, the lion of God, who consumes the sacrifice, into the sanctuary, where God is revealed in his triune nature, which, as we see from the Cabala, was well understood by the Israelites. The Father and Preserver of all flesh gives daily twelve loaves to the twelve tribes; the Son, the "Maschiah," acts as Mediator, offering to the Father the prayers and incense of the people; and the Holy Spirit shines everlastingly in seven-fold light. And within, in the Holy of Holies, is enthroned, between the cherubim, the God whom no man can see and live, to whom, once in the year, the high priest, after purification, offers the golden

vessel full of blood, which is the life of every living soul. What beauty there is in this type of the heavenly 'Temple!

After the law has thus ordered the service of God, it promulgates the great natural law between man and man. In the first place, it impresses on man the sacredness of life, the horror of blood-guiltiness, and the only true principle of justice: an eye for an eye, a tooth for a tooth, a life for a life. Slave-dealing, then the custom, is punished with death. "He that stealeth a man and selleth him . . . shall surely be put to death." Then it inculcates the sacredness of the family and of marriage; the power of the father, the authority of the mother; he who smites or curses father or mother shall surely be put to death. No punishment is adjudged for parricide; such a crime is inconceivable under the Mosaic law. It proclaims the solidarity of the family, of the city, of the tribe, and, finally, of the whole nation. Each for all, and all for each, one in curse as in blessing. Property—landed property, that is—is counted sacred. The punishment for theft, on the other hand, is comparatively slight; for money and goods are not sacred. Then follow admirable ordinances founded upon natural principles. The priest is without possessions. His portion is Jehovah. Judgment is given in public and gratuitously by the elders, the old men, with appeal, in difficult cases, to the priests, who, in their turn, may inquire of the Urim and Thummim. Cities of refuge are appointed, etc. The functions of such a state, entirely in harmony with nature, forming a compact and exclusive whole, were carried on with ease and at very little cost. Prisons and houses

of correction had no place in it, to say nothing of the rack and other instruments of torture used in the Middle Ages. If one man damage another's property, he is to become his servant, but not for longer than seven years. He is to receive good for evil; he is to be made, by useful work, an honest and useful member of society; and if, on the expiry of his term of service, he elects to stay with his master, he is to be received into the family. We put a thief in prison at great expense to the State, and to his own detriment, in order to get rid of him.

There is a place, too, in this law for the poetry and joy and beauty of life. Splendid and obligatory festivals, founded upon the cycle of nature, serve as a bond of union to the people. A sincere pity and consideration for the feeble, the stranger, the widow, and the orphan, is enjoined as a duty. Cattle, the tree, and the ground are to have their rights; all avarice and usury is forbidden; freedom from military service provided for in certain cases; the man who is to receive a pledge must wait outside till it is brought to him. But severely as Jehovah punishes sin and wrong, he will not have a nation of sour-faced killjoys. "Thou shalt rejoice and be glad with thy manservant and thy maidservant and the stranger, and eat and drink of all wherewith thy God hath blessed thee." This people was troubled by no problem of material or social existence. In peace or in war, in politics or national economy, for the State or for the individual, the only question was that of obedience or disobedience. "If ye obey me, saith Jehovah, I will command a blessing and it shall be upon you. If ye obey me not, I will destroy

you out of your land." We Christians might take a lesson from Israel, we, with whom the problems of existence, the continual anxiety about the things of this life, overpowers and overshadows everything: our politics and our treaties, our legislation and our daily acts, our industry and our art. If things go well with us, we desire God's blessing as something which, in any case, will do no harm, though it is not to be expected that it will alter the natural course of events. In order that the people of Israel might not fall into a state of anxiety about their daily bread, and come to look upon their system of agriculture as the source and ground of their wealth, the great ordinance of the Sabbath year was instituted. They were not to sow nor reap in the seventh year, but to eat what the Lord made to grow without their labor. What should we who hold ourselves far above Israel say to such a trial of our faith every seven years?

Finally, God ordains the year of Jubilee, the grandest of all institutions, brightening and beautifying the life of the people, bringing release from guilt and suffering—a magnificent symbol of heaven.

We have in the law of Moses an ideal code, providing for man's every need. Well might Moses exclaim, "What nation is there so great that hath statutes and judgments so righteous?" (Deuteronomy iv, 8); and all who hunger after righteousness will cry with David, that wise ruler and statesman, "The law of the Lord is perfect, converting the soul." Deeply must they sigh over our advanced modern notions of legislation and justice. To-day we make laws, and to-morrow we repeal them; the judgment pronounced by one court

is reversed by another; and if an attempt is made to help the right to its right, and to set bounds to insubordination, blasphemy, and immorality, a general outcry is raised, men feeling or believing themselves aimed at, their interests injured, their liberty restricted. "*Fiat justitia, pereat mundus!*" cried the ancients; and the sentiment was echoed by the iron Puritans and Huguenots. We, however, would like to have laws which do not hurt us, which neither set limits to our desires, nor impose duties on us, which are beneficial to our own particular and private interests, and which conduce to the making of money. All this, by no means, necessarily implies right and justice. What is to become of a nation which puts utility and expediency in the place of right?

It becomes more and more apparent what harm has been and is done, even from the pulpit, by undervaluing and ignoring the Old Testament. We are losing the sense of right and justice because we have come to regard the majestic law of the great and terrible Jehovah, and its fulfillment in the history of Israel and the nations, as only valuable from an historical point of view, as things belonging to the past, forgetting that the Word of God endures forever. We are losing the feeling for truth because we take as poetic exaggeration and figures of speech what God swore to his people by his prophets. We have likewise lost interest in and understanding for the ways of God's dealing with the nations and for the plan of history devised by him; in short, for the word of prophecy in general and for the great and strengthening hope of the glorious and literal fulfillment of its prophecies.

Two-thirds of the Divine Word lie fallow. We do not know what to make of it. We speak of the terrible God of vengeance of the Hebrews, or ask in childish unreason, "What does it signify to my Christian faith whether Abraham ever lived or not?" We must remember that Jesus said: "Do ye not therefore err, because ye know not the Scriptures? Have ye not read . . . how God spake . . . saying, I am the God of Abraham and the God of Isaac and the God of Jacob? He is not the God of the dead, but the God of the living." (St. Mark xii, 24, 26.)

Christ also stands or falls by the Old Testament. If it is a forgery, and Abraham never existed, then Jesus, who believed in Abraham, and came into the world that all might be fulfilled which is written of him in the law of Moses, the prophets, and the Psalms, was a rabbi sunk in prejudice and error, who paid for his unsuccessful attempt at reform with his life. Then there is no Christian religion.

How have we become so blind to the clear revelation of the Jehovah-Christ, the same in the Old and the New Testament, as he appears in the beginning of Genesis, the Gospel of St. John, and the Revelation, the image of the invisible God, whom "no man hath seen at any time," by whom "were all things created that are in heaven and that are in earth, visible and invisible, . . . who is before all things, and by whom all things consist" (Colossians i, 15-17); who was promised to Adam and to Abraham; who proclaims himself to Moses as "the Lord, the Lord God, merciful and gracious, longsuffering, and abundant in goodness and truth, keeping mercy for thousands, forgiving in-

iniquity and transgression and sin, and that will by no means clear the guilty, visiting the iniquity of the fathers upon the children and upon the children's children unto the third and to the fourth generation?" (Exodus xxxiv, 6, 7.) When David rejoices, "The Lord is my Shepherd, who forgiveth all thine iniquities, who healeth all thy diseases," he beholds Christ, of whom he speaks so many prophecies by the power of the Spirit. This same Jehovah speaks to St. John: "I am Alpha and Omega, the first and the last, and have the keys of hell and death." It is this Jehovah who, although during his voluntary humiliation he refused to exercise his prerogative of judgment and lovingly invited sinners to him—nay, bore our sins on the cross—yet uttered his woes on the Pharisees, foretold to the Jews the destruction of Jerusalem, and pronounced the doom of Judas. He promulgated a new law, stricter and more terrible than that of Sinai: "Ye have heard that it was said by them of old time, . . . But I say unto you, Whosoever shall say to his brother, 'Thou fool, is in danger of hell-fire. Whosoever looketh on a woman to lust after her hath committed adultery already with her in his heart.'" Who can stand before such words of thunder? And he continues: "Ye serpents, ye generation of vipers, how can ye escape the damnation of hell? Wherefore behold, I send unto you prophets and wise men and scribes; and some of them ye shall kill and crucify; and some of them shall ye scourge in your synagogues, and persecute them from city to city; that upon you may come all the righteous blood shed upon the earth, from the blood of righteous Abel unto the blood of

Zacharias, son of Barachias, whom ye slew between the temple and the altar." (St. Matthew xxiii, 33-35.) In this we hear the Jehovah of the old covenant, the same Holy Spirit of justice who wrote the psalms of vengeance, and struck Ananias and Sapphira dead for what the world counts a trifling act of deceit, who gave over the sinner in Corinth and Hymenæus and Alexander to Satan. This Jehovah-Jesus is the Messiah and Avenger of whom Isaiah (lxiii, 1-6) and Ezekiel (xxxix, 17-20) prophesy, a prophecy the exact fulfillment of which is beheld by St. John and described by him (Revelation xix, 11-18) in the very words used by the prophets. He sees Christ smiting the nations with a rod of iron and in a vesture dipped in blood, treading the winepress of the wrath of the Almighty; and an angel calls to all the fowls of heaven to gather together and eat the flesh of kings and captains, of bond and free, of small and great. Then he will, with his saints, rule the nations *according to the law of Jehovah*, and will, in the end, judge the quick and the dead, sitting on the great white throne. "The Father judgeth no man, but hath committed all judgment unto the Son." (John v, 22.) After this judgment the Son will deliver up all things to the Father, that God may be all in all. We have a Bible cast in one mold, and a God the same yesterday, to-day, and forever.

Lacking the granite foundation of the Old Testament, we build castles in the air. He who has never felt crushed by the law of Sinai and does not feel it every day of his life talks idly of mercy. He knows nothing of it. Such a one talks and dreams of a Christian social state, of a Church without dogmas, and of

a religion of pure love, which would embrace even the enemies of God. With such sugared water they think to cure the black death, and believe themselves in such card-houses secure from the earthquake.

The inflexible iron law of Sinai has, like all that is divine, stood the test. It made a great nation of a handful of slaves, degraded by four hundred years of bondage. It made great demands upon the individual as well as upon the nation; and it was just that which made it strong, which gave it that firmness and solidarity which we are bound to admire in it to this day, in spite of two thousand years of humiliation and obloquy. If only those blind of heart, who see in the law of Jehovah a forgery of the time of Ezra, would take counsel together and give us such another forgery which might be to us what the law of Moses was to the children of Israel! But "*la critique est aisée, l'art est difficile.*"

Let us go a little further into the Bible in relation to nature. How Job, living amid nature, drew from it his wisdom, beheld in it God and his overruling Providence! When Job's trial is to come to an end, Jehovah descends in a whirlwind, and challenges the man of whom he elsewhere speaks such words of approval to a contest, "Gird up now thy loins like a man; for I will demand of thee and declare thou unto me!" God does not confound him by forcing upon him the consciousness of his sins. He does not comfort him with the promise of their forgiveness; he does not preach to him mercy and repentance; he displays to him his majesty and wisdom in nature, paints for him in words of thunder, in pictures of divine splendor, such as only

a God can paint, the foundation of the earth and the ways and doings and glory of all created things, and calls to him out of the hurricane: "What! Dost thou still believe that a God who made all this could make a mistake in the guidance of thy life?" And Job understands what this testimony of nature means.

David, the hero who faced death in a hundred battles against the Philistines, the Moabites, the Edomites, who had to have a way hewn for him through the ranks of battle by his thirty-three mighty men and field-marsals, each commanding an army corps of twenty-five thousand men; the terrible conqueror who drowned the insolence of his enemies in a sea of blood; the wise statesman who "executed judgment and justice among all the people;" the king who built palaces and the city of David; the wise administrator who, without oppressing his people, probably from tribute levied on other nations, "prepared a hundred thousand talents of gold and a thousand thousand talents of silver, and of brass and iron without weight," for the building of the temple—this true man, hero, and poet "after God's own heart" was an enthusiastic admirer of nature. It is not in praise of his feats of arms, or those of others, of the splendor of his court and palaces; not of the strength of his fenced cities that he sings when he indites a new psalm for the chief musician—his song is of the law of Jehovah, from which he derives wisdom to govern the people, which is his comfort and his study by day and by night; his fortress, his rock, and his strength is the Lord of hosts, on whom he calls when his enemies oppress him, and from whom he looks for aid.

He is never weary of admiring and considering the great work of Jehovah, nature. At one time it is the starry heavens, giving rise to the question, "What is man that thou art mindful of him?" At another it is the sea, "great and wide, wherein are things creeping innumerable, both small and great beasts. There go the ships: there is that leviathan whom thou hast made to play therein. These wait all upon thee, that thou mayest give them their meat in due season." (Psalm civ, 25-27.) Then he takes up his harp as he watches, probably from the battlements of the citadel, a storm coming up out of the western sea, breaking against Lebanon, and dying away over the wilderness of Cades (Psalm xxix), and calls to the heroes and sons who surround him to praise with him the voice of the Lord. The divine psalmist says of the laws of nature, "He hath given them a law which shall not be broken." (Psalm cxlviii, 6.) And in conclusion he exhorts the whole creation to join with him in extolling Jehovah: "O praise the Lord of heaven! Praise him in the height! Praise him, all ye angels of his! Praise him all his host! Praise him, sun and moon! Praise him, all ye stars and light! Praise him, all ye heavens, and ye waters that are above the heavens! Praise the Lord upon earth, ye dragons and all deeps, fire and hail, snow and vapor, wind and storm, fulfilling his Word. Mountains and all hills, fruitful trees and all cedars, beasts and all cattle, worms and feathered fowls, praise the name of the Lord!" (Psalm cxlviii.)

We find, too, in the Bible, a great conception of the weather, this something in nature whose motions and changes we do not understand in spite of all our

meteorology; for why is one year cold and damp, the next hot and dry, considering that all the factors remain the same?

The Bible also, in regard to the weather, goes back through all its phenomena to the root of the matter. "God maketh his sun to rise on the evil and on the good, and sendeth rain on the just and on the unjust." He covereth the heaven with clouds; he prepareth rain for the earth; he giveth snow like wool; he casteth forth his ice like morsels; he causeth the vapors to ascend from the ends of the earth; he maketh lightnings for the rain; he bringeth the wind out of his treasures. It is the glorious God that maketh the thunder. He sets his bow in the cloud. He is Lord of the weather.

There are many nowadays who will say, with a superior smile: "That is the Hebrew view of the matter! We now know the origin of thunder and the rainbow." It is as if a son were to say, "Now I know that what I took, as a child, for the voice of my father is only air breathed out by the lungs and set in vibration through the vocal chink;" or another, "We are now aware that the Sistine Madonna, that unrivaled masterpiece, is simply a mixture of various ochres with oil, smeared upon a piece of canvas with brushes of sable hair or hogs' bristles." If God had produced the thunder and the rainbow in a supernatural manner, the clever ones of the world would have proved them to be merely a hallucination of the ear and an optical illusion, utterly useless as science; but, seeing he does it by natural means, they cry, "That is all quite natural and easily explained; there is nothing whatever mysterious about it!" What is God to do in order to satisfy man?

Solomon, who planted vineyards, made gardens and orchards, and planted trees in them of all kinds of fruit (Ecclesiastes ii, 5), who imported rare animals from foreign countries, held, it would appear, lectures on natural history, probably illustrated by collections. "He spake of trees from the cedar-tree that is in Lebanon, even unto the hyssop that springeth out of the wall; he spake also of beasts and of fowl, and of creeping things and of fishes. And there came of all people to hear the wisdom of Solomon." (1 Kings iv, 33, 34.) The Song of Solomon, too, is full of descriptions of nature, characterized by great Oriental beauty.

The prophets are never weary of telling how all nature will flourish and rejoice in the day when God has mercy on his people, and brings his promises to them to a glorious fulfillment. Let us beware of the intellectual weakness which, as soon as the truth becomes too forcible, takes cowardly refuge in a befogging of fact. A parable is a parable; that of the vineyard, for example, in the fifth chapter of Isaiah, "The vineyard of the Lord of hosts is the house of Israel, and the men of Judah his pleasant plant;" and a simile is a simile, as when it is written, "Who are these that fly as a cloud and as the doves to their window?" (Isaiah lx, 8.) But when God threatens the people of Israel, "The children of Israel shall abide many days without a king and without a prince and without a sacrifice, and without an image, and without an ephod, and without teraphim" (Hosea iii, 4), that is no parable or simile, but a threat which has been as literally fulfilled as that against Tyre: "I will make her like the top of a rock; it shall be a place for the spreading

of nets in the midst of the sea" (Ezekiel xxvi, 4); or that against the great city of Babylon, that she, the glory of kingdoms, shall be overthrown by God, like Sodom and Gomorrah, that the Arab will not pitch his tent there, and that wild beasts shall prowl in her palaces. (Isaiah xiii, 19-22.) Threats are these, of which even an infidel Frenchman says, "They have been fulfilled with grewsome precision." In connection with the threat and curse on Israel it must not be overlooked that the consolation which immediately follows in the book of the prophet Hosea is to be taken just as literally: "Afterward shall the children of Israel return, and seek the Lord, their God, and shall fear the Lord and his goodness *in the latter days.*" (Hosea iii, 5.) And the blessing with which all the prophets close their predictions will also be fulfilled, that oft-reiterated promise: "*In the last days I will gather them out of all countries whither I have driven them, and I will bring them again unto this place, and I will cause them to dwell safely: and they shall be my people, and I will be their God.*" "They shall no more say, The Lord liveth which brought up the children of Israel out of the land of Egypt; but, The Lord liveth which brought up and which led the seed of the house of Israel out of the north country, and from all countries whither I had driven them; *and they shall dwell in their own land.*" (Jer. xxiii, 7, 8.) We ought to ponder humbly these minute, decided, and oft-repeated expressions of God's purpose, instead of turning and twisting them so as to make them fit the present condition of Christendom, merely because to our feeble faith such an intervention of Jehovah in the history of the world appears strange, improbable, nay, impossible.

The present condition of Christianity, our Churches, did not come within the prophets' ken. St. Paul declares that the mystery of the Church of Christ, the mystery "that the Gentiles should be fellow-heirs and of the same body and partakers of his promise in Christ by the Gospel," was not made known to the ancient world, but only to him by revelation. (Eph. iii.) To the prophets the whole period of the rejection of Israel is only "the times of the Gentiles." St. Paul says further on the subject (Rom. xi, 24, 25): "I would not, brethren, that ye should be ignorant of this mystery, . . . that blindness in part is happened to Israel until the fullness of the Gentiles be come in." Afterwards "these, the natural branches, shall be grafted into their own [not our] olive-tree." That the times of the Gentiles still continue, and that Israel is still rejected, is obvious to every one. The fulfillment of the promise, then, is still impending; and as surely as Jerusalem and the Temple were destroyed according to the prophecy, just as surely will they be built again according to prophecy; so surely as God has dispersed his people among all nations, so surely will he gather them again out of all countries as he has sworn by his prophets. (See Ezek. xxxix, 21-29.)

Now the Bible teaches a connection between nature and man in general, and the people of Israel in particular, in such a way that it also suffers under his sins,—a groaning of Creation under the vanity of man. "How long shall the land mourn and the herbs of every field wither, for the wickedness of them that dwell therein? The beasts are consumed and the birds; because they said, He shall not see our last end." "There is no truth nor mercy nor knowledge of God in the land. . . .

Therefore shall the land mourn, and every one that dwelleth therein shall languish, with the beasts of the field and with the fowls of heaven; yea, the fishes of the sea also shall be taken away." (Hosea iv, 1-3.) This belief, too, is gone from us. In the closest connection with God's restoration of his people, whom he has never ceased to love, is foretold a glorious bursting forth and blossoming of nature in Palestine and the adjacent lands—not, however, till the terrible judgments on anti-christ and his nations, so frequently and plainly described, have had their fulfillment. "In that day shall Israel be the third with Egypt and with Assyria even a blessing in the midst of the land." (Isa. xix, 24.) This is to be the oft-promised and oft-described Sabbath of the earth, corresponding to the divine division of time at the Creation. This renascence of nature is described for us in various passages. "The wilderness and the solitary place shall be glad for them; and the desert shall rejoice and blossom as the rose. It shall blossom abundantly and rejoice even with joy and singing." (Isa. xxxv, 1, 2.) "Instead of the thorn shall come up the fir-tree, and instead of the brier shall come up the myrtle-tree, and it shall be to the Lord for a name." (Isa. lv, 13.) "I will open rivers in high places, and fountains in the midst of the valleys: I will make the wilderness a pool of water, and the dry land springs of water. I will plant in the wilderness the cedar, the shittah-tree, and the myrtle and the oil-tree; I will set in the desert the fir-tree and the pine, and the box-tree together: that they may see, and know, and consider and understand together that the hand of the Lord hath done this." (Isa. xli, 18-20.) "The wolf also shall dwell

with the lamb, and the leopard shall lie down with the kid; and the calf and the lion and the fatling together; and a little child shall lead them. And the cow and the bear shall feed; their young ones shall lie down together, and the lion shall eat straw like the ox." (Isa. xi, 6, 7.) "They shall beat their swords into plowshares, and their spears into pruning-hooks. Nation shall not lift up a sword against nation, neither shall they learn war any more. But they shall sit every man under his vine and under his fig-tree, and none shall make them afraid." (Micah iv, 3, 4.) With such grand descriptions of a renovated nature, with such strong substantial consolation the Old Testament, given to the nature-nation of Israel, closes. Instead of joyfully accepting our share in these great and blessed promises, and in the delight of Jehovah in his creation, our poor, hard, faithless hearts, for whom the high is too high, the great too great, and the true too true, lose themselves in artificial, strained, and twisted interpretations of these words of God. The times of the Gentiles are still in progress; Israel is still without king or temple or sacrifice, scattered through all countries and despised; Palestine, the land of beauty, still lies uncultivated and desolate, an abomination of desolation! In spite of these plain and evident facts, the mighty utterances with which God inspired Isaiah and Ezekiel are constantly applied to the wretched conditions of an apostate Christendom, and the great redemption promised to his people is supposed to be fulfilled by the annual conversion of a few dozen Jews! What a mockery of the Holy One of Israel, who is not a man that he should repent, and who will perform these things in his own time! No

wonder that many a youth stumbles at such a wretched, inadequate interpretation of Scripture, and loses his belief.

It is clear that in the New Testament, which deals with forgiveness of sins and spiritual redemption, nature can take only a secondary position. And yet here, as everywhere, it forms the foundation and the background. As at the introduction of the law Moses stands in the midst of nature before the burning bush, and at the introduction of the prophets Elijah by the brook Cherith, so at the introduction of the New Covenant the great herald John the Baptist, a man of nature, grown up in the deserts and fed on locusts and wild honey, stands by Jordan. He does not seek out the rulers, the rich and the learned, the people and the soldiers in their dwellings in the city; but the whole of Jerusalem goes out to him—a symbolical going out from our false and artificial life to hearken to the truth of God in the freedom of nature. And how Jesus himself lived amid nature! He goes out to the Jordan, retires for forty days into the wilderness, teaches on a mountain, sleeps in the open air or on the sea. We are usually told much about the home of a great man, where it is situated, how furnished and arranged; Christ had none. When he wished to be alone he went up into a mountain and prayed there the whole night. What a sublime spectacle! On the mountain-top, in the silence of night, stands a God, and communes with his God; below him, in darkness and the shadow of death, lies a world which he has come to redeem; above him shine the stars which he created, moving in the paths which he ordained! Of what spoke the Elohim? Alas! even

had he heard, the creature would not have understood! We all know how great a part the desert, the sea, the mountain played in the life of Christ. His parables are nearly all drawn from nature, not from trade or commerce, art or science; and he commands us to consider the fig-tree, the lilies of the field, and the fowls of the air, and to learn of them. This nature, the sea, and the winds which he created, he now, in the days of his humiliation, commands. He chooses men of nature for his apostles; and nature which rejoiced in floods of light at his birth, sorrows with her King on the cross.

St. Paul, the apostle of the Gentiles, the great organizer of the Christian Church, had not much time to give to nature. Yet from it he draws his similes of the seed, of the wild and the good olive-tree; and utters the mysterious but pregnant words: "The earnest expectation of the creature waiteth for the manifestation of the sons of God. For the creature was made subject to vanity, not willingly, but by reason of him who hath subjected the same in hope, because the creature itself also shall be delivered from the bondage of corruption into the glorious liberty of the children of God. For we know that the whole creation groaneth and travaileth in pain together until now." (Rom. viii, 19-22.)

Finally, in the revelation of St. John we see the whole Creation brought together to judgment. Till now we have listened to solos and single voices; here is heard the great chorus and Finale of Creation. Lightning flashes; the seven thunders utter their voices; great hail, "every stone about the weight of a talent," falls from heaven; the winds are unloosed; the sea and the waves roar, and the powers of heaven are shaken. The

heavy judgments of God fall first upon man, but also upon the Creation which he has desecrated. They deal terrible destruction, till out of the fire there rises a new Creation, beautiful and pure, a new heaven and a new earth, governed by the same eternal and divine laws. Here blooms and flourishes the tree bearing glorious fruits and leaves for the healing of the nations; here flows the river clear as crystal in the everlasting light; and here man drinks of the cheering juice of the grape, and sits at table in the kingdom of God. The white garments—as against the nakedness of Adam—are the gain which we have to show for six thousand years of sin and sorrow; the city with the golden streets, as against the houseless Eden, signifies the addition of divine art to divine nature!

We see, then, the Bible is full of nature, begins with the creation of nature, tells us of the redemption of man and nature, and concludes with the renovation of divine nature. How comes it, then, that so many Christians look upon it as hardly worthy of religious consideration, as merely a material substratum to life?

But as everything in the world—Christianity and the divine in man as well—exists in three stages of being, positive, comparative, and superlative, we see that this world is given to us: first, that we may live, move, and have our being in it in a natural way, and in faithful singleness of heart draw from nature the knowledge of nature's right, the law by which we are to regulate our existence; secondly, that we may study, search out, and understand nature, learn from her forms, her adaptations to purpose, and her laws, and thus grow in the inner man; thirdly, that we, like Solomon, Socrates,

Haller, Goethe, may know and confess that we, with all our study and research, can never penetrate the secret things of nature, because she bears within her as root and cause of the temporal appearances a part of the Infinite, unsearchable, and unattainable to us captives of the Finite. Our yearnings and our powerlessness should teach us thus to express the sum of the matter: There exists a Higher Nature, which is the First Cause of this lower nature; there is something superior to nature, which is the root of nature. I long to understand it; therefore I was created that I might understand it, and I shall one day understand it.

* * *

If any ask, in conclusion, what becomes of the contradiction constantly insisted on between the Bible and nature, knowledge and faith, all I can say is: I have never found any such contradiction. I have never been able to understand how an astronomical or chemical, a botanical or anatomical fact, a new element, or a new theorem—and on such facts and truths rests, in fact in such consists, the whole of science—how such can prove to us that there is no God, or that he can not work miracles, or that it is impossible to obtain forgiveness of sins by faith.

But as regards the Biblical view of Creation, we shall, in the following chapters, endeavor to prove that it better explains the universe, is more in accord with the facts of natural history, and more satisfying to the human mind than eternal matter, the cell, or the mighty atom. The short account in Genesis of the creation

of plants, birds and fishes, quadrupeds and men, after their kind, undeniably corresponds, as we have already said, in its broad features with the geological periods; is, then, geologically correct. Darwinism, on the contrary, as we have seen above, is at variance with geology.

The Biblical beginning of Creation is, we shall show, scientifically more tenable than the eternity of matter. The Bible explains life and death, the soul and conscience, morality and religion, all the desires and fears of humanity logically, therefore scientifically; not so materialism. The Biblical final resolution (not annihilation) of all elements through excessive heat (see St. Peter ii), and the new Creation which will result from it, is a scientific, astronomical, chemical, absolutely correct conception. Spectrum analysis, the science of the elements revealed by fire, is a true image of the last judgment. Fire reveals the fundamental elements. "The spirit of everything," said Jacob Boehme centuries before the discovery of spectrum analysis, "is revealed by fire, and each emits a different light." Finally, the transmutation from man to angel is exactly that at which, according to the materialist, all nature aims in her evolutions. And the promise, "Ye shall shine as the sun in my Father's kingdom," is not merely a poetic image, but an exceedingly plastic and scientific definition of the highest life. Natural science recognizes as the highest state the development from within of light, heat, electricity, force in all its forms, as it is presented to us in the independent life of the sun. We on earth live, on the contrary, illuminated only from without, consolidated into hard bodies, in cold and death. That, too, is a scientific fact; we saw in the second chapter that

we are not far removed, by scarcely 300° , from absolute cold, in which even gas molecules, frozen, cease to exist.

The outcry about the irreconcilable contradiction between the Bible and science would be unintelligible did one not know that men in all ages have allowed themselves to be taken in tow with catch phrases, in which they put implicit faith so long as they are pleasing and agree with the secret desires of their hearts. The Bible and nature in nowise contradict each other, though many things in nature contradict what men have put into the Bible. Many naturalists and savants of to-day, however, put their estrangement from and hatred of God into their ideas of nature; and as a vine and deadly nightshade growing side by side produce, the one good wine, the other poison, so nature is given to man as ground from which he can obtain good wine or poison according to the principle by which he lives. That is not the fault of the ground. That our century is at enmity with God is not the fault of its study of nature and its knowledge of nature—mark that; how else could so many men of science be good Christians? Nay, the reason lies in the fact that because the race is hostile to God, its views of nature are so too. And so it has always been. It is simply idle talk to say that only in this nineteenth century have men arrived by the study of nature at a recognition of the futility of Christian doctrines. Good and evil, light and darkness, God and the devil, anger and love, man has put into everything that he has thought, invented, done, and written. Even in David's time the fool said, "There is no God!" Isaiah tells how the Jewish materialist cried, "Let us eat and drink, for to-morrow we die." (Isaiah xxii, 13.) Eigh-

teen hundred years ago the world rejected and crucified the Christ without advanced scientific knowledge and a higher criticism. The Sadducees, without the light of modern science, ridiculed the idea of a future life, spirit, and resurrection, like their successors of to-day; and the pampered and luxurious Romans of the Empire persecuted and despised the Christians as socialists and anarchists do and would do to-day if they only had the power.

If you find an irreconcilable contradiction between faith and knowledge, be sure, my friend, that it does not lie in the stars above, nor on the wide earth, nor under the earth; but in your own heart. You are not yet reconciled to God; you fear him, and rightly; you defy him; and this deep cleft in you, which reaches to the root and source of your life, to the very foundation of your being, you believe you find reflected in nature; for you yourself are your conception of nature.

Seek him, even if you can not yet believe that he is. Cry to him, implore him, "O God, if thou art, reveal thyself to me, who am thy creature, and let me not perish in darkness and doubt!" Continue to do so; a man considers a lifetime not too long to earn a fortune; here is much more than a fortune!

And let me know, in this life or in the next, how you have succeeded.

CHAPTER IV

Science

LET us look closely at this great word. It rightly and deservedly enjoys great respect. With the breath of life God has breathed into man an insatiable thirst for knowledge, a craving to know, which will not be denied. He stands on a different footing from the animal, in that he desires to know what he is, what the world is, what God is. "Man," says Pascal, "is miserable because he is, and great because he knows it." The ground of this desire for knowledge, however, lies deeper than in the mere joy of knowing. The element of the soul is not so much the beauty of knowing, as the power of being able. "I can," is greater than "I know." "The joy of the soul lies in action." I can only act on things and beings which I know, whose nature I in some degree understand; that gives me power to rule them naturally and also by magic; for this reason inferior natures put from them the knowledge of things far removed from their ken as useless, asking, "What is the use of it?" To know is the first condition of ability to act, and the soul thirsts for knowledge as a means to power. Knowledge is power. Adam had dominion over the animal creation, only after he had examined them, recognized their inmost nature, and named them accordingly. A dim relic of this remains in our desire to know the real names of things, in the

constantly heard questions: What is that plant, that animal called? What is that man's name? Adam would doubtless have attained to the knowledge of good and evil, and would have been allowed to eat, not only of all the trees of the garden, but also of the tree of knowledge, had he first shown by his obedience that he was willing to accept this knowledge as a gift from God in God's good time, instead of taking it by violence. But Satan, who is the enemy of truth, and therefore of all true knowledge, understood well how to deprive man of this gift when he uttered the words, "Ye shall be as gods, knowing good and evil." Well do we know to our cost that good and evil are; but to know what is good and what evil is the daily decision and torment of our earthly life! As our happiness is only a less degree of misery, our health a mild form of sickness, so is our knowledge no real knowledge, but only a less degree of ignorance; and ever since the Fall it has been the grief of man that the great Book of Creation, inside and outside, spirit and matter, remains sealed with seven seals.

What do we really understand by science? Simply the accumulated present knowledge of mankind; though what is generally understood by it is more the careful investigation and sifting of facts, the clear and comprehensive enumeration of them, and the logical statement and presentation of the intellectual results obtained.

This human science, as we know only too well, is an edifice composed of light and darkness, of truth and error, of humble research and arrogant dogmatism, of daring hypothesis and clearly-demonstrated theories, of millions of facts and billions of thoughts, of the inborn

and the acquired, of yes and no, of dreams of the past and the future, of unbending prose and high-flown poesy; an edifice continually being built up, now slowly, now quickly, and in constant need of repair, ever growing, yet never completed; to whose construction has gone much sweat of brow and burning of midnight oil, much ambition and aspiration after fame, much earnest labor, and bold and resolute thought. "The experimental sciences," says Humboldt, "are never complete; the number of sensible perceptions is inexhaustible; no generation of men will ever be able to boast of having witnessed the totality of phenomena."

Science is none other than the sum total of human knowledge, and as such worthy of honor. How great we can not say; very great if we reckon all the thoughts, ideas, feelings of the millions who have lived; not very great if we extract only what is fact. If we consider what a number of impressions of the world and men, plants and animals, tools and instruments and their application, speech and logic, a child of ten has gained, we may question whether the savant in years of study has gained proportionately more. We arrive at the like result by another way. If we take into consideration that there have been men like Aristotle, Goethe, Humboldt, and others who succeeded in the space of fifty years, of which the half was sacrificed to the needs of nature, in gaining an astounding general acquaintance with all human knowledge, we are amazed, on the one hand, at the number of ideas which a human being can master in a few years with the help of not quite three pounds of brain, yet still more at the circumscribed nature of our total knowledge.

Does not this hardly-earned knowledge deserve our esteem? Has not science rendered invaluable and innumerable services to man? Is it not material, nay, indispensable to existence, if man is to be anything better than the savage, the Patagonian who sets all his endeavors on catching a few fish, which he devours partially cooked to support his miserable life? Most certainly we honor and revere science in so far as it means knowledge. Far be it from me to ridicule or undervalue a thirst for knowledge, my brother, or the zeal and eagerness with which you search for stones to add to the great and incomplete pile of human knowledge. I, too, would fain know what I am, what my neighbors are; what Creation is; what is good and what is evil, the great Riddle which only God in the Heaven of heavens, in unapproachable Light, wholly knows. But I see, too, how others greater than I have sorrowfully confessed, like Socrates, that they only knew they knew nothing. Like Solomon, "I said, I will be wise; but it was far from me. That which is far off and exceeding deep, who can find it out?" Or as Faust exclaims:

"I've studied, now, Philosophy,
And Jurisprudence, Medicine,
And even, alas! Theology,
From end to end with labor keen.
And here, poor fool! with all my lore,
I stand no wiser than before,
And see that nothing can be known—
That knowledge cuts me to the bone."

He who knows not this sorrow of heart, who has not become "poor in spirit," may be a learned man, but he is not yet a wise one!

We can not here go into nor discuss the achievements of science; that would require many thick volumes. Neither do we propose to utter a panegyric on science, its progress in some fields, its retrogression in others, its usefulness to mankind, and its lofty task. That is done every day, in writing and by word of mouth, by hundreds qualified and unqualified to speak, by earnest students, and by those to whom their own glorification is the chief concern. Just for the reason that at the present day men are inclined to exalt science unduly, it may not be out of place to subject to a little criticism this goddess who criticises God and the world, and to inquire briefly what means of knowledge are at her disposal; further, what bounds are set that she can not pass; and, lastly, what are her faults. If any think, from these remarks, that we do not rate science sufficiently high, the mistake may be on their side, who ascribe to her a power, a dominion, an infallibility, which she does not possess, and which the greatest scientists do not claim for her.

Many take for granted nowadays that of necessity "where science begins, belief ends;" for, they say, science is founded upon clear, recognized facts, provable by every one, while faith rests upon the emotions and a more or less vague sentimentality. How far this is true of the Christian faith we will consider elsewhere; but as regards the foundations of science, consideration will show that she, too, is based on axioms, on articles of faith, on assumptions which can neither be proved nor comprehended, which never completely explain the facts.

This is the case even with mathematics, which is rightly held to be infallible in its deductions and con-

clusions, which men like Plato regarded as the only science. It is true it pursues its way with absolute decision and a compelling logic; the chain of its conclusions can not be broken, and he who has said A in geometry and algebra, trigonometry and integral calculus, must say B; but the first link of the chain hangs in the air, and I am at liberty to say A or not as I please, for the whole structure is based upon axioms. Not the cleverest mathematician can give me an idea of unity and number if I have not got it in me, and no one can prove to me that at which old Socrates wondered, that one and one make two, or that the part is less than the whole, or that a straight line is the shortest way from one point to another, or that if A and $B = C$, then $A = B$. Thus mathematics itself requires that we should believe without further proof in order to deduce from this belief other conclusive facts.

It is the same with the sciences which treat of matter and its properties, with physics and chemistry. Science can not tell us what matter is. "The essence of matter," says Kekule, "withdraws itself from any direct study." Chemistry sets up, as we have seen, the dogma of the atom—which has incomprehensible and contradictory qualities—in explanation of the chemical combinations of the elements which go to form the universe. For the adequate explanation of phenomena it ought to possess all the properties of bodies; how should they otherwise have come by them? For the proper explanation of chemical combinations which only take place in certain proportions, it ought to be indivisible; a quality which, thought of as in connection with matter, is simply unimaginable. Dr. Meyer, of Geneva, says in his work on

force and matter: "As no amount of thinking can prove to us that matter consists of separate molecules (or atoms) of infinite minuteness, what leads us to believe it? That all chemical and physical phenomena of matter can only be explained by laying this assumption as a foundation, even although nothing further is gained than the summing up into one incomprehensible so-called idea of a great number of hitherto incomprehensible things which are comprised in that idea."

Physics treats of forces; but what man of science can tell us what force is? Let us hear what Dubois-Reymond has to say on the subject: "In face of the enigma of the nature of force and matter, and how they are capable of thought, the student of nature must once for all make up his mind to the distasteful motto, *Ignorabimus*"—"We shall never know how matter thinks!" (Ueber die Grenzen des Naturerkennens, page 34.) Elsewhere he makes the startling statement that "there exists probably neither force nor matter, but that they are merely abstractions."

Similarly all astronomy is based on the theory of gravitation. Of this force, Newton himself, its discoverer, says that though bodies certainly appear to attract one another, he neither knows nor understands how such a thing is possible, and probably there is no astronomer who would not assent to his words.

In order to explain the force of gravitation and the diffusion of light and heat throughout the universe, modern astronomy has put forth the hypothesis of a universal ether which, in addition to other remarkable properties, has that of being six hundred billion times lighter than air; therefore to us quite immaterial.

Nevertheless the pressure exercised by this ether is said to counteract gravitation. We have nothing to urge against the hypothesis, though it does not appear clear how, in face of it, the moons of Mars can revolve more rapidly than their planet; an hypothesis, however, it remains! If we succeed with its help in better explaining the phenomena and construction of the universe, it will gradually become a dogma; it never can be actually proved, for how can we grasp a substance so intangible, so imponderable?

Botany and zoology, biology and physiology, treat of organisms, which are distinguished from the inorganic world around by having life. Of this fact of life, Professor Seubert, of Tübingen, says: "Chemistry has produced thousands of organic substances, it is true, but not one bearing in it the breath of life; the life-force is still a mystery to us."

Dr. Karl Müller says of our whole knowledge: "Every philosophy starts, as Herder says, from a postulate; that $2 \times 2 = 4$ we know; but nobody can say why it is so."

Science, therefore, the entire knowledge of mankind and the individual man, is found to rest, when tested calmly and impartially, on unprovable truths, on axioms which God has put into our souls. If they were not there already, we could never put them there. Our knowledge is, after all, only deduction, and instead of the grand-sounding words which in reality tell of great ignorance, "He who knows does not believe," every truly wise man will agree to the pithy words of Geibel, "The end of philosophy is to know that we must believe."



If we ask with what means and tools Science works, what instruments she has at command to fathom the world, nature, man, the answer is very simple: The five senses. Whatever ingenuity man may display in the invention of improved apparatus for the observation, measuring, and controlling of nature's manifestations, and in having these clever inventions regulated by others still more ingenious; and however he may set up instruments which, like self-registering barometers, thermometers, hydrometers, hygrometers, etc., keep and account day and night of their own doings, and themselves note exactly all that has taken place, yet he can only perceive all that those instruments have to tell by means of his senses. Of what use are photography, the microscope, and the telescope to the blind?

But are not these impressions of the senses, as we have often been taught, only subjective representations, impressions received by the brain as sound, light, heat, of an activity of matter which is in reality something quite different? In that case they would lack absolute truth, and the whole world of ideas built upon these impressions of the senses as to ourselves and the universe in general, nay, of God also, would have only a relative and by no means eternal value. *Nihil in intellectu quod non fuerit in sensu!* Only through the gate of the senses can knowledge enter the mind! Let us imagine a child of average intellect entirely deprived of its senses; blind, deaf, destitute of taste, touch, and smell; how could it, even in the course of years, attain to a single idea of the world and of God? Without the senses, then, there can be no ideas. But if the former are only subjective, the latter must be so too, and we have with this

arrived at the philosophy which recognizes the outside world as only what we make it.

This notion is contradicted by facts. Some of the lower animals show a development of certain senses which far exceeds ours. The condor swoops down upon a small body from heights where he was to us invisible; certain moths fly for miles, over Lake Constance for example, attracted by the smell of certain flowers; some insects possess an exceedingly fine sense of hearing, and what the scent of a bloodhound is, is very well known. Sir John Lubbock, the indefatigable observer of ants, has proved that these insects, and also the little water-fleas, *daphnia*, can see the ultra-violet rays of light which are not perceptible to our eyes—they see more colors than men, and different ones! According to the above-mentioned idea, the most highly-organized beings ought to have the best developed senses, or *vice versa*, the animals with such fine and highly-developed organs of sense ought to have a wider, finer, greater conception of God and the world. But if we, on the contrary, perceive absolute facts by means of the senses, then it is very easy to understand that to the higher intellect of man a much smaller measure of sense-impressions is needed for the gain of a much greater amount of intellectual capital. It is certain that these sense-impressions are in all men the same, and that one man does not, as has been supposed, see red what another sees blue, for the like emotions and states of mind are called forth by these impressions, by colors and sounds. Not only men, and especially madmen, see red as a vivid, bright, glaring, exciting color; but also animals of the most varied kind, the bull, the turkey, the crocodile, quadruped, bird,

and amphibious creature. To all men pale blue is mild and gentle, and black, gloomy; and similarly all people feel the different effect of a melody in a major and in a minor key.

For these and other reasons we must take for granted that sound, light, heat, etc., are actual and absolute manifestations of matter which lie outside us, and are independent of our perception of them. That is how the Word of God regards them. When a well-known naturalist writes, "The Mosaic expression, 'Let there be light!' is physiologically false; light was not till the first red eye-point of an infusorium distinguished for the first time between light and darkness," we can only marvel at the careless way in which such men read the Bible. For it is written: "And God said, Let there be light; and there was light. *And God saw the light* that it was good." Here we have a theosophical view which is as far above that of the naturalist as the eye of God above the red eye-point of the infusorium. In the Eternal God are the senses, and ours are but a feeble image of his.

On the other hand, these same senses prove to us how imperfect they are, and how small a portion of the world around us they enable us to perceive. We live like an impoverished prince in an attic of a splendid palace, and do not even know all its halls, galleries, and corridors. The energy of the invisible emission in the spectrum is 7.7 times greater than that of the visible portion; in other words, we do not see the strongest colors, can form no conception of them; in fact, we see only a very small proportion of the colors at all. We can discern with our eyes changes in the photographic

plate which went on in what we call darkness; we see tiny stars which human eye never beheld reveal themselves upon it in the form of black dots. In the same way our ears hear, very imperfectly, only eleven octaves, according to Helmholtz, or still less, for many people can not hear the shrill whistle of the bat; while physics teaches us that there must be thousands of octaves. We then see, hear, taste, and smell only a very small part of Creation; we are blind and deaf to many of its manifestations—which is true, also, of our soul's life.

We do not know whether space has four dimensions or many dimensions; similarly we do not know whether there may not be senses innumerable; is not God infinite and his Creation too? At any rate the five senses we have teach us that others exist even on earth. For instance, to return to the animal world, there is the case of bats blind from excess of light which, according to Spallanzani, fly about in a room across which wires with bells attached have been stretched, at tremendous speed for hours together without once coming into collision with the wires; again, a turtle which had been caught in the Pacific Ocean and branded with the ship's mark was thrown overboard as ill in the English Channel, and was fished up again in the Pacific three years later. How did the creature find its way those thousands of miles through the dark depths of the ocean and round Cape Horn? Similarly birds of passage with wonderful "instinct," as we meaninglessly call it, seek again their last year's abode amid the clay huts of the fellaheen and the temples of Egypt, in the Soudan or in Tunis, to return as unerringly next spring to the cottage or the village church in Germany, to the neighborhood of

London or Moscow, although so many hundreds of rivers and villages and hills look exactly alike. Pigeons taken in a basket from Belgium to Spain, and there set at liberty *after five years*, were back in Brussels within a few hours. A dog, too, has been known to follow the track of his master after the lapse of three months from Russia to France, over rivers and mountains, without being led astray on any other trail. The sense of smell has nothing to do with it! In the case of such facts we must assume the existence of other senses, especially in the lowest animals. Certain eyeless worms (*lumbricus*) shun the light altogether, and a kind of blind mollusks (*pholas*) close their tubes if the slightest cloud veils the sun. A *patella*, that tiny mollusk the limpet, goes out in search of food, and returns to the same smooth, flat piece of rock. How is it possible for a morsel of jelly, without any organs of sense whatever, to remember the way, recognize it, and take it? Still more mysterious is the case of the infusoria, which consist merely of a sac filled with fluid, and yet flee from their foes, pursue their prey, and eat only certain kinds—all this without a vestige of visible organs. Here we are at our wit's end!

Physics, too, teaches us that there must be other senses. There are various forms and kinds of heat (see Tyndall, *On Heat*), modulations and shades of it in fact. We, however, can only feel one kind of heat, distinguish only between warm and warmer; are, therefore, in regard to heat like a man who is color-blind to light; he sees the world only light and dark. If we had a sense of heat as fully developed as our sense of color, what a number of impressions and delights we should gain; we should have a heat-art, as we now possess a color-

art! The sense of electricity is also wanting in us; we are not even able to distinguish between positive and negative electricity. A new world would be open to us and to science if God were to bestow on us this sense; as, contrariwise, if he had withheld from us the sense of taste and smell, no man would ever have suspected the existence of different odors and flavors. So many senses, so much knowledge.

Thus the universe is hedged round for us by the number and the acuteness of our senses; they set up the boundaries within which our science must be carried on. May we not ask whether it is not to new and fuller senses that the words refer, "Eye hath not seen nor ear heard, neither have entered into the heart of man the things which God hath prepared for them that love him?"

* * *

With regard to the limitation of science by our sensible preceptions, the celebrated thinker and scientist, Dubois-Reymond, held a lecture on the subject, which he followed up by a second on the seven world-riddles. As a matter of fact, he only says what many have long thought and known, as he himself confesses; nevertheless the disputes which it occasioned, the bitter reproaches which were heaped on him by the materialists, and the exaggerated rejoicing of the orthodox as if this one man's utterance had made a new creation, show how well-timed his words were; and for this reason we quote here his concluding sentences.

In the first place, Dubois-Reymond makes the statement already quoted, that "to understand nature is to

refer the changes in the material world to the motion of atoms or to the resolution of natural processes into the mechanism of atoms." Then he cites Kant's words, that "in every special nature-dogma there is only just so much science as it contains mathematics." Even Plato of old said, "God carries on geometry everywhere." Dubois-Reymond then quotes from the astronomer, Laplace: "A mind which for a given moment was cognizant of all the forces which animate nature and the mutual relation of the beings of which it consists, and who understood how to analyze these data, would with the same formula grasp the motions of the largest celestial body and of the lightest atom; nothing would be uncertain to him, and future as well as past would be present to his sight;" and then he inquires what limits to knowledge, what insoluble problems would present themselves to such a mind, conceived as a man of the highest intelligence, and finds several. "These problems," he says, "may be taken as seven in all. Those which appear to me absolutely unconquerable I will call transcendental.

"The first riddle is the nature of matter and force. As one limit to a perfect understanding of nature it is in itself transcendental. All the progress of science has led to nothing on this subject; all further advance will be equally powerless. For even the mind of Laplace, so much greater than ours, would be no wiser on this point, and we recognize with despair that here we have reached the limit of our ability.

"The second difficulty is the origin of motion. We see motion arise and cease. If we try to imagine an original state we come to this, that we think of matter

as infinite ages ago at rest and equally distributed throughout infinite space. As a supernatural impulse can have no place in our scheme of things, any sufficient ground for the first movement is wanting. Or if we think of matter as in motion from all eternity, then we renounce at the outset all hope of clearness on this point.

"The third puzzle is the origin of life. I see no reason to consider this difficulty transcendental. If matter has once begun to move, worlds may be formed; and under favorable conditions that peculiar state of dynamic equilibrium of matter which we call life may have come into being. If, however, we admit a supernatural act, then one day of creation is all that is necessary. (?)

"The fourth puzzle is afforded by the apparently intentional fitness of the arrangements of nature. Darwin showed in natural selection a way of circumventing them; though in holding to this doctrine we have always the feeling of the drowning man keeping himself above water by clinging to a plank. This fourth difficulty is so far not transcendental, however timidly an earnest and conscientious mind may face it.

"The fifth puzzle, again, is absolutely transcendental. This enigma is consciousness. What imaginable connection can subsist between certain movements of certain atoms in my brain on the one hand, and on the other the to me original undeniable facts: I feel pain, pleasure; I am warm, cold; I taste sweetness, smell the scent of roses, hear the sound of the organ, see red; and the certainty directly resulting from them: therefore I exist? It is absolutely and everlastingly incomprehensible that it should be otherwise than a matter of perfect indifference to a number of atoms of carbon, hydrogen,

oxygen, nitrogen, etc., how they lie and move, how they lay and moved, how they will lie and move. It is impossible to see how consciousness can arise from their mutual interaction. If their position and mode of motion were not a matter of indifference to them, one would be compelled to think of them as, like monads, endowed separately with consciousness. However, that would neither explain consciousness in general, nor contribute in the slightest to the explanation of the consciousness of the individual.

"It is not with full conviction that I set up, as sixth difficulty, reasoning thought, and the origin of language intimately connected with it." (This is sufficiently treated of under consciousness.)

"In close connection with it stands the seventh, and last, problem of the series. This is the question of free will." After a minute consideration of this question, in which he quotes Leibnitz and other writers, Dubois-Reymond comes to this conclusion: "As to the seventh puzzle, it comes to this: If one makes up one's mind to deny the existence of free will and to explain the subjective feeling of freedom as an illusion, the difficulty disappears; in the other case, we must pronounce it transcendental." Professor Dubois-Reymond now sums up in these words: "Our knowledge of nature is, then, circumscribed by the bounds which are set to it by the inability, on the one side, to understand matter and force; on the other, to deduce mental processes from material conditions. Within these limits the man of science rules as lord and master, dismembers and builds up. Beyond these limits he is, and always will be, powerless." It is of these great world-riddles that

he pronounced the word *Ignorabimus!*—We shall never know!

We owe a debt of gratitude to this eminent scientist for speaking out openly and frankly what many of less mark try anxiously to gloss over by proclaiming to the world that man's capability of understanding is unlimited, that to science nothing is impossible.

Nevertheless Professor Dubois-Reymond might, we think, have gone still deeper to the root of the matter. We believe that, deeper than free will and consciousness, matter and force, lie the fundamental conditions of existence, which must first be discovered that the edifice of true knowledge may be built up on a sure basis and granite foundations. By these we mean time, space, and number. In time everything exists, without space no phenomenon is imaginable, and all thought is based upon the fact that $1=1$ and $1+1=2$.

It is true that there is a philosophy, which we touched on in speaking of the senses—to which, perhaps, Dubois-Reymond does homage—which teaches that time, space, and number only exist in our imagination; that they have their origin in our thought of them; that the universe, in fact, only acquires reality through our idea of a universe. It is extraordinary that the idea should be placed on a level with the reality. According to this doctrine, then, what the periwinkle on its rock thinks the ocean to be, that the ocean is; or the ant's notion of a mountain is the mountain. O the folly of a man's thinking that his conception of God is God! What the outcome of this opinion is, is shown by Schopenhauer, one of its adherents. After saying, "Time is a contrivance of our brain to lend an appear-

ance of reality to the absolute nothingness of the existence of things and ourselves," (!) he goes on: "The geological processes which preceded all life upon the earth existed in no sort of consciousness—not in their own, for they possessed none; not in any other, for there was no other. Consequently they had no objective existence—*i. e.*, they did not exist at all." And further: "The cosmogony of Laplace and the earliest geological phenomena up to the appearance of organic nature are a description of phenomena *which, as such, never existed*; for they are phenomena of time, place, and cause, which, as such, can only exist in the conception of a brain, and consequently, in the absence of such, *are impossible, and never existed*." The whole of the ancient mountains, then, with their granite and gneiss and basaltic giants, are the result of processes which never took place! It is not necessary to refute such statements.

The materialists who, like Schopenhauer, allow time only a subjective existence in my thoughts, nevertheless contradict themselves by teaching the eternity of matter. Whether the spirit can exist without time is a question which admits of disputation. Matter, however, with its forms and essential conditions, without which it would not be matter, can not be imagined apart from time and space.

We have already stated grounds for the objectivity of our perceptions by the senses; and we believe also that space, time, and number existed before us, and are outside us. Let us consider these three great unities of existence in an unscientific manner.

Every one thinks he knows what time is; but all the

learned and the unlearned of the world can not define it. With a power that is irresistible, this mysterious, invisible something carries us onward, whether we will or no. "Time and tide wait for no man." Whether we are looking forward with joy to our wedding, or with shrinking terror to our death, the shoreless stream flows on unceasingly, silently, bearing us on its tide towards the ocean. The flood of the past rises, has already swallowed up our childhood, our youth; soon our whole life will be under water, and we shall have vanished, to be, as far as this world is concerned, a thing of the past. And it is a blessing that it relentlessly carries away with it our work, our cares, our anguish; a blessing that "time and the hour runs through the roughest day." We could not endure the omnipresence of time.

How long is time really? How long is a second in itself? No one can say. We measure it by our feelings, by our thoughts. Sensations run through our nerves to the brain with the speed of an express train (Helmholtz); and ten separate impressions are about as many as we can take in in a second. If we thought with the rapidity of the hydrogen molecule, earthly nature would appear to us motionless, dead, and unchanging. If beings exist who think proportionately slower, and spread the experiences of five minutes over a century, creation is to them an incomprehensible whirlwind; for they have not time to grasp the single phenomena before they are gone.

The ticking of a clock is one of the weirdest, most awful things. Hark! how your life is running by so monotonously, so incessantly, and falling, drop by drop,

into the eternal nothing! With every tick a "moment" enters your life, a stranger from eternity, casts a glance at you, and is gone before you can stretch out your hand to grasp it. What will the next bring to you? Failure of the heart's action, perhaps; and in the one after, you "are" no more, you "were!" You are to your dear ones now only a memory; or, the next moment the bell rings! The postman! A telegram! You read it. It tells of the death of one of your dearest; perhaps of ruin, disgrace, misfortune, to yourself or your family—for misfortune lies in wait for us—and from that moment your life can never again be what it was. And ever nearer and nearer comes the last moment of all: a long or short death-struggle; the doctor says, "It is all over;" your family burst into tears, and kiss the pale form which but now was you; but you have left forever the earth, where time flowed on like a river; you are there where the æons roll onward in God, like shoreless and fathomless oceans—the true time, of which ours is only an image and an outflow, where you will forget that you were ever mortal. Everything in this world happens in time. Men are born and die "in the fullness of time." "And it came to pass," say the Scriptures. "Earth's insufficiency here grows to event." (Goethe.) Every moment that passes belongs to the past—irreclaimable, unattainable, whether great, important, blissful, sorrowful, or tedious. And between these two abysses, these two mysterious eternities, we are poised, as the Arab says, on the edge of a razor-blade. Something is ever falling from us into the past: our deeds and our guilt, the terrible *culpa*, which grows, in the invisible world, to giant pro-

portions, overshadowing the present and the future. As the penny put out to interest two thousand years ago would now amount to an enormous sum, one single murder committed by Attila destroyed millions who might have existed to-day; and one lie suffices to make millions unhappy and sinful now. The battle of Actium was lost through the panic of a woman, and the course of the world's history was turned into other channels. We fifteen hundred million human beings suffer from the single fact that Adam once put forth his hand, took, and ate. But good deeds, too, bear fruit forever. As a grain of wheat in time produces an immense quantity of bread, a word of truth spoken ages ago still brings forth a thousand-fold to all time. We and our actions are eternal. "Ye are gods." What is the past? What is the future? The traveler sees stretching before him the way he is to travel. We, however, walk backwards, our faces towards the way we have just accomplished, not knowing whether we may not, the next moment, stumble and fall over the precipice. Are there worlds where the beings look forward, where the past is as mysterious and unknown, as dreadful as the future is to us, and where the future lies as open as to us the past? It was so with the prophets, with Balaam, when he exclaimed, "I behold him, but not nigh!"

Space, too, is a mystery to us. Is it finite? Yes. What is there, then, where it ceases, and what its boundary? If it is infinite, how can we form any idea of it? Is matter, too, infinite? For what is space without matter? If we were in space empty of matter, how should we be aware that we were moving, whether

at a snail's pace or with the rapidity of lightning, over a space of a few inches or several million miles; for how should we distinguish between "here" and "there?" What is motion? And what is size? If space is infinite, there is no such thing as large and small. The pyramids are very imposing; a model of them, a foot high, is a plaything. Of course, because we think of size in relation to ourselves, and measure with our "foot," or with the forty-millionth part of the earth—the meter. But how large are *we* in reality? On an asteroid giants as large as Mont Blanc; on the sun, small as ants; in the universe, invisible particles; under a microscope with a magnifying power which gives an enlargement twenty thousand times that of the object, we would be nearly forty miles high. This conception does not satisfy chemistry. In her sight we are solar systems revolving at enormous speed, nebulae composed of innumerable billions of atoms and molecules, endowed with marvelous and eternal energies, incessantly drawing together and separating. Each atom, each molecule is, perhaps, proportionately, as far from the next as Jupiter from the earth. Of what size does an atom appear to an angel? Of what size do we appear to the God of space, who sees each one of the innumerable atoms of which we are composed? In any case, humanly speaking, we are immeasurably great in his sight. All these and other unanswerable questions arise from the most cursory consideration of space. And yet without space there would be neither form nor size nor motion, neither being nor existence.

As we do not know what time, space, matter, and force really are, neither do we understand the laws of

the mutual relation of these great unities. We do not know the relation of time to vital force. We do not understand why some insects live only a few hours, a crow 200 years, the lion 30, and man 80 years, instead of 5,000 or 50,000. In this case, too, we accept as a matter of course what we can not explain. We do not understand the laws of space and size of things and beings. We do not know why the diatom is so small and the Sequoia red-wood so gigantic; why the elephant requires so much space for his bodily presence, and man only two and one-half cubic feet. We do not understand the correlation of force and matter. We do not know why the whale requires six pounds of brain to think with—twice as much as Shakespeare and Newton—and the ant, with its much greater intelligence, only $1/7000$ of a gram; nor do we know why, as a rule, bodily strength decreases in proportion to size, so that flies are ten, twenty, or fifty times stronger in proportion to their bulk than the elephant and the lion, and with them, according to M. Plateau's careful investigations, "the strength is in inverse ratio to the weight."

No less mysterious is number, the root-form of thought, the condition of all being. That $1=1$ and $2 \times 2=4$, this exceedingly simple and yet inexplicable fact is the condition *sine qua non* of the universe, the inexorable law, and the fatality of all being. This simple-seeming number, the beginnings of which can be mastered by a child, grows and grows beyond the earth to the farthest fixed stars, and far beyond the limits of thought. Let us take an example. The largest number that we can write with three figures is, in the first place, 999. When we come to the numbers

to the 9th power, we have the number 9^{99} , identical, as regards numerals, but far greater; the 99th power of 9, a number of about 90 places, a number so large that a globe with a circumference equal to the earth's orbit would not contain the like number of grains of sand. Stupendous, too, is 9^{99} , the 9th power of 9 to the 9th power. Our imagination has long ago left us in the lurch. But if we write this number $9^{(9)}$, the (9 to the 9th) power of 9, the mere addition of the brackets causes the number to explode to gigantic proportions, divine and diabolical, no longer human; for now these three figures express a number with three hundred and seventy million places, which, in ordinary printing, would reach from Berlin to the Adriatic, for which all the languages of the earth have not words enough; of which, if they denoted grains of sand, all the inhabitants of the world, in millions of years, could count only a fraction! And yet this number exists; in God, first; but also in infinite space as size, in infinite time as æon; and millions of such would not exhaust space and time. What forms of life exist in those unfathomable infinities of space! Where shall we immortal beings dwell through those unimaginable æons? Shall we be advancing ever towards God, far, far above all our present thoughts and ideas? For there is a divine progress and a divine evolution of the divine in the Divine!

Number, however—and that proves how divine it is—is in itself neither great nor small; in other words, in its smallest form it is infinitely great. Draw, with a pencil, ever so small a circle; yet there lies within it the problem of the squaring of the circle, the rela-

tion of the circumference to the diameter, a relation which can not be exhaustively expressed by all the numerals of the world. Here are the first decimals: 3.141592653589799323846264338327950288-41971693993751058809749445923078164062, etc. The number has grown to infinite proportions. Eternity will not exhaust it; for it is beyond grasp; and yet it is contained in every pin-head and grain of shot.

The very fact that we can only take in number in its simplest beginnings, and that it soon grows over our head, proves that we are in the first stage of our eternal development. May there not exist beings who can clearly grasp the above number of three hundred and seventy million places, and mentally reckon with it as well as we with one of two places? With regard to time, space, and number, we are likewise forced to cry, Ignoramus!

We arrive thus, not without astonishment, at the conviction that science, though it teaches us so much that is true, useful, and important concerning the things of our ken, their form and appearance, is powerless when it comes to an explanation of the nature of these same things.

Our answer to the gibe and reproach of the materialist, that we Christians "love to take refuge in dark corners which Science has not yet illumined with her lamp, there to spin webs for the capture of sound reason," is: We do not need to take refuge anywhere. Here we stand on God's wide earth, and demand of Science: What is this space which surrounds us, and this time which bears us ever onward? She does not know. What is the matter on which we stand, and of

which we are, and the forces which animate it? She does not know. What and whence the life I see around me, and the soul which I feel within me? She does not know. The dark corner "which Science has not yet illumined with her lamp" is called the universe.

Once, when a schoolboy, I chanced to meet a man pre-eminent in the world of science. I stopped him, and begged him to tell me why grass is green. "With pleasure," he replied, affably; "because the cells are filled with green chlorophyll, which shines through the cell-walls." "Yes, I knew that; but why are the chlorophyll granules green?" "Because they consist of a waxy substance which possesses the property of reflecting the green rays." "What is a green ray?" "A vibration of the ether at the rate of six hundred and sixty billion times in a second." "A green vibration? It gets more and more difficult to understand. How am I to imagine it?" "As you like," he said, shrugging his shoulders, and went his way. And I stood still, pondering his words: substance, property, green ray, vibration, ether! Each an abyss of thought!

This inability to find out the nature, the essence of things is the inevitable cause of the insufficiency and incompleteness of all our scientific ideas. To begin with, there is the utter impossibility of imagining the atom, invisible as it is and ever will be. Then bodies appear to exercise the power of attraction upon one another in agreement with Newton's law of gravitation; but the attraction is an incomplete, because unintelligible, idea. The undulatory theory of sound and light fits in well with many facts; but it remains a puzzle how thousands and thousands of sound-waves in a

concert-room resound in and through one another, without interfering with one another, or being merged in those following; and it is still more marvelous and mysterious that, in a crowd of a thousand men, millions and millions of ether-waves paint in each eye a picture of the surrounding world, differing, perspectively, in each case. Our entire physical explanation of capillarity, endosmose, etc., as taught in schools and colleges, is open to question. If we could generate temperatures of $10,000^{\circ}$, an entirely new chemical science would arise, says a chemist with truth. "The science which we have designated as satisfying for the present our need of discerning the relation between cause and effect, does not do so in reality. It is not knowledge, but only the substitute for an explanation." (Dubois-Reymond.) Nevertheless this recognition of ignorance is an essential part of true science. The saying of Pascal holds good here also: "Man is ignorant because he is; but he is wise because he is aware of it."

* * *

It remains, now, for us to speak of the faults of science; for, being human, it has various human failings. First, the desire of impressing the lay mind by the use of strange and technical expressions, and an involved style of diction. One must often complain of it, as Dubois-Reymond does of modern philosophy: "It has lost the language of common sense and calm deliberation. It evades the questions which agitate the simple seeker after truth, or contemptuously ignores them as uncalled-for suppositions." Many men of

science believe themselves called upon to wrap up their knowledge and their thoughts in involved and obscure language, avoiding any approach to clearness and definiteness of expression. To write so that every one would at once understand would be unscientific, amateurish.

We are all led away by words and phrases. Now it is the sparkling, brilliant, witty style, "the lie of eloquence," over and under which Petrarch sighed; now it is the weighty and authoritative expression of apparently sure and certain knowledge; now the simple and artless style which enslaves us; and words—our own words—rule us with a rod of iron. Man wrestles with them, would fain make them serve him, would fain compel truth from them, and finds, when life is waning, that he has lost the battle.

The Frenchman is continually lapsing into the "phrase spirituelle," and running the risk "*de dire des riens avec esprit*." The Italian unconsciously tries to produce an effect by the use of sentimental superlatives; the Russian loves to take humanitarian fads for religious ideals; the German gapes in speechless admiration at the scientific phrase, and thinks, when he can no longer see the bottom, it must be very deep, whereas it is often only because the water is muddy! That it is possible to be learned, and at the same time wanting in sense, you will never get him to believe.

Schopenhauer hits the nail on the head in his criticism of the style of most scientific authors: "The guiding principle ought to be that, as a man can only think *one thought* properly at a time, he must not be expected to think two or three at once. . . . The reason

why most ordinary minds prefer an involved style is that it costs the reader much time and trouble to understand what he would otherwise grasp instantly; and thus the impression is created that the writer possesses more depth and a greater intellect than the reader." And elsewhere, "Let a man in saying extraordinary things make use of ordinary words."

The highest ambition of others is to be original, witty; as the French say, "spirituel." But the pure, whole truth is never so. Original, "spirituel," signifies the personal, individual, therefore one-sided, often paradoxical and hyperbolical presentation of a fresh side of the truth, for which reason what is "spirituel" may tickle the fancy, but is not of universal benefit.

Christ, who was the Truth, who spoke for all mankind, who was filled with the Spirit, never uttered a word to which that epithet could be applied. When a man like Hegel finds himself obliged to confess at the close of his career, "Of all my pupils, only one understood me, and he misunderstood me," he censures his whole wisdom; for true wisdom is before all things intelligible. "Simplicity is the sign of truth," is an old Latin saying.

It is refreshing to find that great savants in all nations speak in intelligible language. In Tyndall, Arago, Humboldt, Helmholtz, in Macaulay, Thiers, Ranke, the same greatness of mind, the same deep comprehension of causes and effects, the same clearness and coherence in the observation of facts and in deduction, produces the same beautiful diction.

Scientific phraseology is, like every other phraseology, very dangerous. One can positively bring one's

self to believe that there is really something in it. The employment of it is due to a desire to appear greater than one is, to excessive self-confidence. This is one of the failings of science. She has always believed her present knowledge to be more or less absolute; she has been too much inclined to draw deductions from what she knew as to what she did not know. We know how the men of science assembled at Salamanca proved to Columbus by the help of science from Aristotle's time onwards that the earth was not a globe, and that, if it were so, he might go down on one side, but never up on the other.

The science of the eighteenth century, too, lived in proud consciousness of her infallibility. How she smiled when told of stones falling from the sky! The Academy of Paris, in the year 1800, declared the reports presented to it on the subject absolutely incredible. Goethe relates how he himself, at the time, ridiculed the idea, and now, towards the end of his life, is making a collection of meteoric stones with much interest. The same Academy refused to receive further communications on the subject of magnetism, treating it as a delusion. This same subject is now scientifically studied and publicly lectured upon under the new names of hypnotism, suggestion, by Professor Charcot, Bernstein, Forel, and others. The Parisian astronomer, Lalande, coolly rejected the work of Bessel on luminous satellites with the words, "We do not believe in such things;" and German astronomers, too, made merry over Bessel's discovery. At the present day double stars are among the most absorbing objects of scientific research. Only fifty years ago science, and so compe-

tent an authority on the ocean as Edward Forbes, taught that at the depth of 300-500 meters all life became extinct, vegetable as well as animal, neither being able to develop, or even exist, because of the enormous pressure and the absolute darkness. We know now from the researches of the *Challenger* that at a much greater depth—as far, in fact, as man has penetrated—there exists a plenitude of delicate organisms, shining with a many-colored, red or green phosphorescent light of their own; some of them with huge eyes, occasionally on the end of long horns. As a rule, science is at fault when she denies. There is “helium” on the earth, life in the depths of ocean, stones in the sky! For a long time there were disputes as to the Föhn, the hot wind of Switzerland. Some brought it from the Sahara, others from the Gulf of Mexico, until at last the simple Swiss were found to be right in believing it to arise in Switzerland itself, as the Norwegian Föhn does in Norway.

Science long ridiculed the idea of the ground-ice found by fishermen and sailors as a physical impossibility, etc. As Arago pithily observes, if we had never seen fish, we should prove scientifically that no living thing could exist in water, and especially in sea-water, containing chloride of sodium and iodine; and, as Flammarion says, on the other hand, every philosophic fish looks upon life out of the water as an impossibility. If we had no knowledge of transparent substances, we should certainly maintain that hard, solid bodies were necessarily opaque. Till quite recently no one had any idea of the fourth gas in the air (argon) discovered by Professor Ramsay,

a discovery of which Dr. Müller writes: "Who would have believed such a thing possible, considering how often the air has been tested and examined by the most careful chemists, with the best instruments? We are constrained to say with Hamlet that there are many things in heaven and earth undreamed of in our philosophy." With what scorn has chemistry long spoken of alchemy! But now several renowned chemists—Professor Berthelot, for example—admit that the hypothesis of an elemental substance on which alchemy is based is as acceptable as any other chemical theory. Till a hundred years ago science knew nothing of a natural force—electricity—which in another hundred years will play a principal part on earth, unless by that time it has been superseded by some new force more easily obtainable from the sun's rays. If a physicist at the beginning of the century had been told that it was possible to transmit a force of several hundred horsepower a distance of several hundred miles by means of a copper wire, without any movement of that wire, or even its becoming warm, he would have smiled sarcastically, and said that such a thing was in direct opposition to the simplest laws of nature. The opinions of authorities on and against the introduction of railways at the beginning of the nineteenth century now only raise a laugh at their absurdity. Scientists looked upon Daguerre as insane when he declared he would not rest till he had succeeded in fixing the sun-pictures. Immediately before the application of spectrum analysis to astronomy, Dove disposed of the astronomer Zöllner with the words, "We do not know what the stars are, and we never shall know."

In still more recent times science believed that the primal slime at the bottom of the sea, from which all life originates, had been discovered in the famous *Bathybius Haeckeli*; that the primordial organism had been found in *Eozoon Canadense*; and that Professor Koch's tuberculine had given to the world an infallible remedy. What has been the fate of these and similar triumphs of science? Too often she strikes out a new path, only to find it a blind alley. When Helmholtz published the law of the conservation of energy which had been first discovered by Robert Mayer, but which he had more clearly grasped and demonstrated, "the authorities on physics in Berlin treated the work with disapprobation, declaring it a fantastic speculation or downright absurdity. The editor of the principal scientific journal refused to accept it." (Memorial Oration on Hermann von Helmholtz, by W. v. Bezold.) And now, as the above writer remarks, this discovery stands as a proposition "the definiteness and comprehensiveness of which must be designated as the greatest triumph of which natural science can boast since Newton discovered the law of universal attraction."

We have, thus, good and reasonable grounds for not believing without evidence all that this goddess named science asserts, and for not rejecting at once everything which she is pleased to ridicule; for present-day science has not grown any more modest. She, too, in spite of her boasted freedom from prejudice, laughs at everything which does not fit in with her systems and theories, at everything for which she has not yet been able to find an explanation.

One instance is the influence of the moon and other

heavenly bodies on the vegetable and the animal world, although this influence is manifest in the case of the sun, is shown in the tides, and therefore by sound reasoning must be held possible, though in a slighter degree, of all heavenly bodies, considering that we know next to nothing of the electrical and other effluvia of the universe. The lunar influence is evident in the case of many lunatics; and the fishermen of the Mediterranean are well aware that the sea-urchins (*ursinees*) living in the depths of the sea where no moonbeam ever penetrates are only succulent and eatable when the moon is waxing; when it is on the wane they are almost dry.

Science in general treats homœopathy with contempt, in spite of the number of facts which go to prove that a quantity which can not be weighed nevertheless has an effect. The thousand millionth of a cubic millimeter of a dark aniline solution acts upon the optic-nerves; and less than the billionth of a cubic millimeter of musk upon the olfactory and other nerves; in fact, the following proposition, stated long ago by Laplace and Bertholet, is a sufficient defense of homœopathy: "An atom or molecule which has been set in motion by any force can communicate its motion to any other atom with which it comes in contact." (Liebig, *Chemische Briefe*, page 289.) And yet homœopaths and allopaths, anti-vaccinators and the inventors of various natural cures, are bitterly antagonistic to each other, accusing one another of gross ignorance and carelessness of life—a proof how far medical science is infallible!

Science scorns prophetic dreams and the interpre-

tation of dreams, and thinks to account for them by reflex action of the nerves and other meaningless expressions. It laughs at spiritualism and its experiments in materialization, although many worthy men (according to the *Banner of Light*, over ten millions), among them doctors, lawyers, professors, who for years have carried on experiments in their own families to the exclusion of strangers, vouch for the truth of the statements; we can hardly believe that all these men are the victims of an absurd and nonsensical hocus-pocus such as certain spiritualists perform in public for money.

The science of to-day laughs, too, at visions and prophecy, as well as at demoniacal possession, ghosts, magic, and divination. These are certainly things in which to believe openly is "a disgrace to the present century." What different ideas people have! In my opinion among the many things of which the century ought to be ashamed should be included the superficiality and over-hastiness with which it rejects everything which goes beyond its horizon, stigmatizing such with virtuous indignation as "blinded superstition"—a failing from which well-meaning but ignorant Christians are not free. We may be sure a race of men quite color-blind would work themselves into a state of moral indignation if they were continually hearing people talk of shades of yellow, purple, and blue.

It is, on the contrary, to be expected of unprejudiced inquiry that it should not ridicule without due examination phenomena which have been manifested in millions of instances among all the nations of the earth during thousands of years; phenomena of which serious and even scientific men, like Kant, Goethe, Schopen-

hauer, to mention only a few moderns, are careful not to speak slightingly; and to which it can only oppose the flat and stupid denial: It is impossible, for I do not believe in it. It suits them not to believe in it; otherwise the consequences would be too unpleasant.

I said, to believe *openly* in such things is a disgrace; for as every civilization is but a varnish or veneer covering the natural wood, the fashion of to-day covers with a triple coat of enlightenment a superstition, even among the cultivated class, hardly ever surpassed in grossness. The ridiculing of such things in broad daylight is like the ill-concealed cowardice of the boy who whistles in the dark. Those who laugh at ghosts in a brilliantly-lighted drawing-room are horribly afraid of passing the churchyard at midnight on their way home—whereby hangs many a tale—and thus the ghosts have their revenge. Much might be told of the superstition of princes and kings, their consorts and their courtiers; of the daily consultation of the cards by the freethinker, Gambetta; of the fetish of the aristocratic and enlightened gamblers at Monte Carlo and elsewhere, the dearly-bought slipper of a suicide, a blood-stained banknote, the piece of rope with which a man has been hanged; of the superstition of the atheistical Berlin stockbrokers who base their speculations on the color of the horse of the first mounted policeman; of the Lord's Prayer printed backwards, and of the amulets which are for sale in many towns; of the philters and charms which are used by many educated people, and even by Christians! Any one who is acquainted with the state of things knows what value to set on the assertion that superstition vanishes before enlightenment!

Superstition is the weird shadow thrown on our path by the invisible wings of the powers of darkness, "the spirits of the power of the air," the indestructible feeling of a great and mysterious connection not to be severed between all existences, which binds us and our fate with invisible chains to the greatest and the smallest, the nearest and the farthest-off in nature; and its eternal relation to the two conflicting principles of being. And because these are truths, however confused, disconnected, and apparently senseless and absurd the individual conception of them may be, no enlightenment and no amount of preaching against them will have any effect. Only, as Jacob Boehme says, let us take refuge in the heart of God from the storms of Satan!

Let, however, in ten or twenty years' time some ingenious mind investigate any one of these phenomena scientifically, give it a Greek name, and introduce it as "the latest result of scientific research"—as has been done with hypnotism, which was known to the Egyptian priests and practiced by them as a remedy (see Plotinus, Book IX)—and it will become the fashion to believe in it, and be interested in it, just as it is now good form to laugh at it. God have mercy on our fickleness and instability!

* * *

We might refrain from entering here on a discussion of the critical side of science, as that deals not with nature, but with history. Yet it forms at the present day so integral a part of all the sciences, and extends its operations to God and nature to such a degree that it

is advisable to touch upon it. A certain amount of criticism, impartial and kept within bounds, may be of benefit, although truth proves its right to the name independently of all criticism, in that it stands the test and endures. But nowadays criticism in general, and Bible criticism in particular, has so greatly degenerated into a one-sided negation that it is becoming ever more needful to assume towards it an attitude of skepticism and anti-criticism. On closer inspection, one is amazed at the untenability of its hypothesis and the shallowness of its objections. When we hear how the Trojan war is believed to have reference to the Northern myth of the rape of the sun-maiden; how Jacob with his two wives and twelve sons is explained as being a personification of the year, in which, according to Jacob's blessing, Naphthali represents January, Ashur December; how the Forty-fifth Psalm is supposed to be a love song composed for Ptolemy Philadelphus by one of his courtiers; and how in January (sic!) of the year 164 B. C. an unknown Jew began to write the Book of Daniel, we do not know whether to be more amazed at the audacity of the teachers or the credulousness of their audience. According to such a method there is scarcely a single historical fact which could not be laid open to doubt, not an historical personage who could not be resolved into a myth; while so declared a materialist and enemy of dogma as Vogt writes: "A dogma, however tumble-down it may be, showing cracks and rents in all directions, can not be looked upon as constructed merely of air, smoke, and mist; the myth has in all cases had its origin in some fact."

Forty years ago critics proved that there had never

been a Homer nor a Troy, and in 1892 we were told that the name "Homeros" was a Græcised plural of the Celtic "omar," a collection, in order that "omeros" might mean "collections." (Rieke.) Then Schliemann came upon the scene, and without much ado set to work, excavated and found Troy and Mycenæ!

Alas! what will critical research one day make of us twentieth-century persons, if indeed it take any notice of us at all? It will vaporize us into phantoms and shades, into myths and allegories. We can imagine Macaulay's New Zealander, or some Australian or Japanese of the year 3000, if the world is then in existence, after sketching the ruins of London and Berlin, returning to his own country, then at the head of civilization, and delivering an interesting lecture on the Goethe myth. He will prove brilliantly and conclusively that it was quite impossible a Goethe could have lived at the time stated, as not a trace was to be found in his writings of the great struggle raging at that period between his country and its hereditary enemy, the Gauls. "This pretended national poet," he will exclaim, "has not a word to say about his compatriots who were then fighting and dying for their country; he has not a word of enthusiasm for the rising of his people against the tyrant; nay, the man does not even appear to be aware of the existence of such a person as Napoleon! And yet we are asked to believe that he lived at the same time, and was actually Minister of State to a prince engaged in the war! You see how such an assumption breaks down under serious criticism. I believe, gentlemen," he will continue, "that if you will permit me to lay before you briefly the results of investigations car-

ried on through many years, you will come to share my view that we must on no account imagine an historical personage under this name. The name, to begin with, Goethe—more correctly, Gothe—is found, on closer investigation, to be an old national name of the Germans. In this way, then, ‘the collected works of Goethe,’ ascribed to this man—according to the newest reading, ‘Works collected by Goths’—display such varying views and such differences in their intellectual standpoint, and also in language and style, that we must look upon this ‘Goth’ as the personified genius of the Germanic nation, celebrated as thinkers, in the various phases through which that tribe passed in the course of centuries.

“Let us consider the fragments still extant, which are attributed to this mythical author. In the popular poem, ‘The Erl-king,’ primitive man is wandering through the night in constant dread of the dark and destructive forces of Nature, which he personifies, and is chiefly concerned with the preservation of his material existence and the propagation of his species, represented by the child. We have here only father and child, the family in its simplest form. The State does not as yet exist, and the complete ignoring of the mother points clearly to the subordinate position of woman in that age. In agreement, too, with the oldest historical sources, the horse is mentioned as the only domestic animal. The concluding words, however, ‘The child was dead,’ supply a striking refutation of the assertion made by certain idealists that the idea of the immortality of the soul is innate in man. This primitive man, gentlemen, did not even know that he had a ‘soul,’

and thousands of years probably passed before he acquired this metaphysical conception.

"We shall not be far wrong in placing the origin of this poem in the primeval period of this people and in representing to ourselves the unknown author as a troglodyte, subsisting on acorns and horseflesh, and in constant dread of the elemental forces of Nature.

"The next picture is somewhat lighter. The allegorical poem of 'Hermann [or German] and Dorothea' (according to the newest reading, 'Dothea' or 'Gothea,' female Goth), belonging to a later period, was originally the composition of certain priests, but bears traces of several later elaborations, interwoven with moral maxims of an earlier period. It describes the peaceful union, after a struggle of centuries, of the two peoples, 'Germans' and 'Goths;' and in it pictures of the domestic comfort of a settled race, acquainted with agriculture and certain trades, are not wanting.

"The small fragment that remains of 'Götz' is totally different in character. Here, it appears, we have an account from a contemporary of a proud and cruel tyrant, whose severity and inflexibility is symbolically represented by the 'iron hand,' which has been taken literally (!) by some simple commentators, but which, as has been proved, owes its origin to the mode of expression then in use. We know nothing further either of the obscure author or of the chief figure of the drama, who is undoubtedly non-historical.

"The last and most remarkable work which remains of the Goethe, or Gothe, or god—for, besides the etymological connection of the words, the ideas seem to have developed, one from the other, and there are au-

thentic traces of a Goethe cult—is divided into two parts, the second of which, though written centuries later, is unanimously regarded by modern criticism as a continuation of the first; the first part of the name of whose hero, Faust, betrays a mythical origin, shows a decided relapse into barbarism. Gloomy superstition alternates with contempt of science; the devil appears in person; people still believe in magic and witchcraft; the language is uncouth and often distinctly coarse. Hitherto, for this reason, the date of its composition has been placed after A and B with certainty, yet not before C. Since, however, recent research has enlarged our knowledge of the so-called 'Dark Ages' with the characteristics of which the first part is strikingly in harmony, critics assume that this partly historical but much mutilated poem had its origin about the year 913. Unfortunately, we know nothing of the author of this work, which was formerly falsely attributed to the 'Goth.'

"In the second part we find the coarse and childish ideas and images purified and spiritualized into philosophical allegories. The language has become much more scientific, and, therefore, more difficult to understand; in short, the whole bears witness to an advanced stage of intelligence and enlightenment. In comparison with the more mythical first part, the second—at least as far as the figures of the emperor and the courtiers are concerned—may be entitled to be considered as, at any rate partly, historical. Whether one century sufficed for the accomplishment of this refining process, or whether several were necessary, is a question which research has not yet satisfactorily answered.

In this case, too, gentlemen," the learned professor will say, concluding his interesting and instructive lecture, "the torch of critical investigation has succeeded in illumining the obscurity in which the lapse of centuries had enveloped the mythical figure of the 'Goth,' and in presenting him as the personification of the poetic genius of this once powerful nation." (Loud applause.)

Some ambitious youth will put forward the proposition that the giant figure of Bismarck, with his broad-brimmed hat and big dog, borrowed from an older god—Odin or Wotan—was originally nothing but the severe northern winter. He will show him engaged in a perpetual conflict with a certain Napollo, or Apollo (the *N* denoted then negation or defeat), a sun-god of the south, worshiped from most ancient times, rising in the east from an island in the sea, and sinking to rest in the western ocean. His twelve "marshals" evidently represent the months; and symbolic statuettes of him, with a star, or sun, on the breast, and mystic semi-circular headgear, symbolizing the course of the sun, are still found here and there. He will describe how, after a long struggle, this Northman, or winter-god, leads the sun-god away captive, which occurrence is celebrated by a national festival at the beginning of winter (September 2d). He will point out the numerous discrepancies in the unreliable sources of information, and how this same figure is represented, according to the changes of season, at one time in the garb of a commonplace Northern squire, at another as ruler of the world; at one time as universally hated, at another as the idol of the age; now as the friend and guest of Apollo, and

again as his deadliest foe. He appears in one place as friend and adviser, in another as bitter opponent of a certain Emperor "Wilhelm," who is described, first as a white-bearded old man (winter), then as a fiery youth (the spring which succeeds); and these apparent, because literally understood, contradictions he will interpret and explain away to the entire satisfaction of his audience. Finally he will show how this figure of Bismarck, which originally represented winter, gradually attained another significance by becoming, to the popular mind, the type of the heroic national spirit, which vanquished the hereditary enemy. "This mythical Prussian squire, who becomes ruler of the world, is taken later on as the symbol of the small State of Prussia, which developed with extraordinary rapidity into a great power; and by degrees this type of the German people is endowed by the popular fancy with various attributes of Teutonic origin, such as the great appetite and still greater thirst, the pencil one and one-half feet long, the long pipe, and the beer-mug, at the same time retaining the hat and dog borrowed from Odin," etc.

All that is required is a moderate amount of acumen and a certain quantity of imagination, in order to be able to put together and interpret traditions and facts in such a way as to make out just what one wishes to make out, just what will coincide with one's theory or opinion.

Or a still easier way is to say: 'There is no such thing as prophecy, . . . because there is no such thing. Where it occurs, it has been interpolated later. But as no one knows by whom, it is disposed of in some

such words as, "The unknown author of this indubitably interpolated passage." The process is, you see, exceedingly simple; nevertheless there are people who regard it as scientific.

One of the saddest sides of modern criticism is the desire to drag down every great personality to the critic's own level, to impute all great and magnanimous acts to mean, selfish, and ambitious, if not worse, motives, and to bring to light or invent failings in all the great characters of history. It shows of what spirit it is by taking delight in whitewashing such villains as Nero, Tiberius, Henry VIII, etc., and representing Moses, Elijah, Daniel, and the evangelists as superstitious imbeciles, or, at best, well-meaning deceivers, if they do not altogether deny their existence. The amount of injury which is done by this kind of criticism is very great. Men are being educated more and more in the belief that the human race has been, for four thousand years, systematically swindled and deceived, first by the Bible, and then by each source of history in turn.

We are to believe that during these thousands of years even the best and wisest of men have been quite incapable of discriminating between gross imposture and truth; that, as a matter of fact, everything, all goodness and greatness, rests, more or less, upon deceit, and true wisdom consists in scenting everywhere intentional falsehood or self-deception. A miserable, mean, narrow standpoint this, which can only bear miserable and unwholesome fruit.

There are spiritual laws and analogies, probabilities and harmonies, great lines and sequences in the history

of the world, which are of far greater importance to a right knowledge and understanding of it than any cleverly-filled gaps in the accounts or apparent contradictions in the documents (as if the world and the life of each individual were not full of contradictions), or sources of doubtful authenticity, or isolated testimonies from possibly ignorant or misinformed or hostile contemporaries, on whose authority criticism often presumes to give the lie to the unanimous opinion of thousands in all centuries, the *consensus gentium*, and the judgment of the spirit; for with all its pretended acumen critical unbelief rests mainly on a lack of true acumen, of a feeling for what is true and standard, on the inability to distinguish what is immaterial from what is important, or to see the logic and the justice of things, we see daily how little clearness and intellectual power goes to the making of a skeptical critic, who can not see the rock for weeds and bushes, nor the wood because of the trees.

That William Tell and Joan of Arc never existed, or that Shakespeare did not write the plays attributed to him, is, apart from any counter-proof, a psychological absurdity, in which only those can believe who have no standard of truth in themselves. It is the common fate of such people to fall victims to every critical imposture out of sheer dread of being imposed on. The charity which "believeth all things" is, at the same time, the highest wisdom; and God takes care that it has much to believe.

It is not to be denied that there is an appalling amount of falsehood and deceit in the world; but there is far more truth. Falsehood usually swims on the

surface, concerns itself more with what is trivial and transient. At the bottom, the world is based upon truth; how else should it endure?

God takes care that, as a rule, justice gets her rights, even in this world, in spite of the number of unjust men, and also that mankind should not be nourished on lies. How else could they live? It is a part of the rule of Providence that the fundamental truths of history have remained true down to our times. All the inventions and discoveries made by man have been adapted, in a wonderful manner, to his intellectual condition and requirements at the time; and it has been ordained that in this century, in which reigns a critical temper of mind, which would cast doubts on the whole past of the human race, this past should rise in a marvelous way from its ashes. The graves and tumuli, the cave-remains and the lake-dwellings, the magnificent ships of the Vikings and the galley of Tiberius; Egypt, with her religion, her laws and customs; Babylon and Nineveh, with their palaces and libraries; Troy and Pompeii, their games and domestic life,—all have risen and are rising from their graves! And we look on and wonder; for what the Bible tells and what Homer sings of these things, so it is! And even old Herodotus, with his tales of pigmies in Africa, the labyrinth, dolphins trained for fishing, and many other wonderful things, has not altogether deluded us.

* * *

We readily admit that science has its place in the life of man and mankind; for the faculty of knowing is one of the most precious gifts which God has be-

stowed upon His creatures; and the proper use of this inestimable talent has done great and good work. But render to each one the things that are his.

In taking a survey of the history of the world, we find, not without some surprise, that science has never been an important factor. It has never either established or destroyed an empire. Not by the help of science did Alexander, Cæsar, Tamerlane, or Attila, not to mention Buddha and Mohammed, conquer their world. Science did not bring about the descent of the barbarians on Rome, the Crusades, the Reformation, or the French Revolution. Neither Napoleon's empire nor the German Empire arose through science; and the world-war and the social crisis, which are to come in the future, will neither be prevented by means of science, nor won and vanquished by it.

The poets to whom the world has listened in every age did not sing of science. It is not science which gives to youth its charm, to woman her beauty and sweetness, to old age its venerableness and its pathos. We must look elsewhere for the springs of life. The Spirit now whispers softly as Æolian harps through the world, now wails through the forest, presaging misfortune; now gathering in fury, becomes a tempest, a hurricane, sweeping before it, like withered leaves, men and nations. This Samson, as was said long ago by Matthias Claudius, does not critically examine whether the locks and bolts of the gate are securely fastened, whether it is made of solid wood, and of what kind; but with laughter he tears up gate and lintel and posts, and carries them up the mountain. Where, however, the spirit is lacking, and "the godlike madness, which is better

than sober deliberateness" (Plato), the only thing is to seat one's self at one's writing-table, and set about proving, with more or less ingenuity, that there is neither spirit, nor storm, nor hurricane—all that is but the snoring of the Absolute, alias World-idea. And he who knows no better cries aloud for the space of two hours, "Great is Diana of the Ephesians!"

It is evident that science is not indispensable to action. Daily, unlearned and noble-hearted men and women do great and good deeds which compel our admiration. The people of the Hebrews, the Romans of the Republic, the Persians of the time of Cyrus, the Spartans, the Teutons of whom Tacitus writes, were all, without any knowledge of science, upright, happy, and contented, as are, at the present day, the simple, true, and honest, shrewd and humorous Bavarians and Tyrolese, Swiss, and Norwegians. Besides the men of the Bible, the fishermen of Gennesaret, who conquered half the world by their preaching of the cross, there have been, in all ages, great men who were not learned men, the saints and the benefactors of mankind, the divinely-gifted artists, and the men of iron, who were the support of their nation in times of storm and stress. Tyndall, himself a man of great learning, says candidly, "There are things which are of greater value than science: nobility of character;" and Plato gives this definition of a good life: To think what is true, to feel what is beautiful, and to desire what is good.

Science is no substitute for the faith, hope, and charity which move the world, and, great as it is, can neither give man happiness in life nor comfort in death. It does not make him better either, much as its enno-

bling moral influence is lauded at educational and other congresses. Science is a power like electricity or gunpowder, a power in the sense in which money is a power, but is in itself as little moral or immoral, noble or ignoble, as electricity, gunpowder, and money. The moral man uses his knowledge and his wealth in a moral manner; the immoral man in an immoral manner. This is seen in the case of Communists, Russian nihilists and anarchists, who are often men of considerable scientific attainments. Dostojewsky says of the criminals in the Siberian *ostrog*, almost all of whom were murderers, "Half of them were educated, and could read and write well;" and adds, "Where would one find, elsewhere in Russia, two hundred and fifty men, taken from all classes, half of whom could read and write?" It is a terrible thought that, as we have already said, the number of juvenile criminals increased in Germany fifty-one per cent between 1882 and 1892, in spite of compulsory school attendance and improved educational methods. These are melancholy facts and results which no amount of fine talk about progress at educational conferences can do away with. In this department, more than in any other, is it true that "by their fruits ye shall know them." If modern education would give us, instead of advanced theories, new systems, psychological and psychopathical ideas and experiments, youths who, like the Persians of old, learned "to fear the gods, to honor their parents, and to speak the truth," we should believe in it. Even the advanced and enlightened *Figaro* wrote indignantly on the crime of the talented and cultivated assassin, Emile Henry: "It has come to this in the nineteenth century!

This is what pride of free thought and the whole farce of compulsory education ends in! The youth, on leaving school, very soon forgets who invented the locomotive, the electric telegraph, or the antiseptic treatment; but he will never forget the name of Vaillant or that of the wretch who followed his example. It is discouraging to the last degree!"

Neither science nor even education is potent to make men better; and the fallacy of the hope that the spread of popular education will avail to stem the tide of socialism is being ever more and more clearly demonstrated. The majority of socialists and anarchists are, as a matter of fact, better educated than the conservative country people. That knowledge is not the same thing as wisdom is a truth which we are nowadays too apt to forget.

In practical life, too, science is not everything. Men arrived long ago at a recognition of the fact that "to know" is not necessarily synonymous with "to be able;" that learning and ingenuity, though occasionally united, are by no means identical. Mother-wit and presence of mind, courage and resolution, are often better than any amount of learning. The Germans are undoubtedly, as regards science and philosophy, the foremost nation of the world; but the unpractical German savant has passed into a proverb; while the Englishman in the colonies, without any bureaucratic education or scientific study, will instantly form a correct judgment, and act on it.

Religion and education are not sciences, the study of which is necessary to everlasting life and the proper bringing-up of children. If it were so, it would be a

sad thing for the thousands of poor, uneducated men and women who would fain go to heaven and bring their children up properly too. "Religion," says Pascal, that deep thinker, "is God manifest to the heart;" and true education is, first of all, a natural education. The fear of God and maternal love are gifts of God, and stand far above science. The greatest men of God—the patriarchs and prophets, Abraham, Isaac, and Jacob, David, Elijah, John the Baptist—did not make a scientific study of religion; nor were these men, or Christ himself, brought up on any educational system, but naturally. And how many uneducated mothers have brought up great and good sons! For there is an intuition, a spiritual beholding and feeling of truth and right, which has no need of deduction and explanation. Science is of value only in the domain of the intellect. In the domain of soul and spirit it is not needed. A woman with no scientific knowledge whatever will sometimes with a word confute the dry-as-dust student. Undoubtedly there is much to be learned from pedagogical and religious text-books; but they have never made an educationalist or a man of God who was not one already by the grace of God.

One word more about "popular science," an expression which is its own condemnation. The popular is never scientific, nor the scientific popular. This fact deserves more attention from the well-intentioned savants who do not understand the people, and from the philanthropists who do not know what science is. To be scientific requires as special a talent as to be an artist; the former talent is, indeed, probably rarer. In the first place, it requires a strong desire to under-

stand the relation of cause and effect. He who is indifferent to the reason why the apple falls and the pendulum swings isochronically has no talent for science, though he may be witty, clever, practical, and an excellent citizen, husband, father, friend, and Christian, a matter of far greater importance. Secondly, science demands the capability of concentrating one's thoughts for a length of time. And, lastly, it needs a long, patient, and persevering process of working one's self into the elements and fundamental laws of knowledge. People in general are wanting in the first two qualities, and they have not time for the last. We have doubtless all had occasion to observe how people who had attended a popular lecture on science, next day remembered nothing of it but a few witticisms which had aroused great hilarity. The sensible workingman rightly prefers to take his hardly-earned rest and recreation with his family, or in the open air, rather than in the form of a diluted and sugared draught of popular science.

We heartily recommend the spread of a solid, useful, and connected knowledge of geography, history, and natural history, with regard to which, in the present day, we might in many cases say, 'The more learned, the less gained.' Of what advantage is it to the ordinary artisan or tradesman, however good at his own business, to know the dynasties of the Pharaohs or the details of the War of the Spanish Succession? Of what use are names such as Graian and Cottian Alps; of what use to know the dental formula of the pig, or the percentage of nitrogen in the bean, or unreliable statistics as to the relative value of food-products? A solid knowl-

edge of a multitude of useful facts is, however, not science. That only begins with the inquiry into causes, with the discussion of the intellectual value of facts. "The roots of phenomena," says Tyndall, "are imbedded in a region beyond the reach of the senses; and less than the root of the matter will never satisfy the scientific mind."

A nation of scientists, if such a monstrosity were possible, would be a phenomenon as sad, because as unnatural, and consequently injurious, as a nation composed entirely of painters or lawyers. Good and necessary as salt is for man, he could not live on salt alone.

If you really wish to gain a true idea of present-day education and culture, take your stand on the pavement of one of our capitals, and stop the first ten gentlemen who are on their way to club or theater in the proud consciousness of belonging to the twentieth century, the age of enlightenment and progress. I do not mean that you are to drive them into a corner by asking them scientific questions on the embryogeny of the rabbit or the theory of the polarization of light. Ask them, simply a few questions about God and the world, about what concerns them and surrounds them, about the things which interest every one and are of importance to every one. Ask them, first, their conception of God and their relation to him. If they answer, "There is no God," then ask them how the universe originated. If they say, "Of itself," ask them the simplest questions about the heavens above and the earth beneath; ask them what the sun is, and what the earth; why we see always our side of the moon; why the days increase and decrease in length; why it

is warm in summer and cold in winter. If they can not tell you, come down to the earth, and ask them about the sea and ships, and how they sail with the wind against them; about mountains, and of what rocks and strata the hills of their native country consist, and whence come the many fossils; ask them about fish and their gills, about shellfish and how their hard shells grow, about beetles and caterpillars, about trees and fruit culture, or about their own bodies and what and how many bones they have. If they tell you they are townspeople, and have not much acquaintance with nature, ask these citizens of the State questions on politics and religion, the powers of Parliament, and what constitutes eligibility for election, what are their rights and duties as citizens, to what laws they are subject, what is permitted and what prohibited; ask about the Constitution of their country. If they answer that they are better informed on practical matters, ask them something about house-building or gardening, about electric tramways, or what a turbine is, or how the locomotive draws the train, or what is the newest telegraph, what a gas-motor is, or what they know about the telephone which they use daily. In short, ask them anything about the world and nature, about past or present, about geography or botany, about art or literature, painting or architecture, philosophy or psychology.

Ten to one, their answers, if you get any at all, and if they have not long ago told you to go to the devil with your questions, will open your eyes as to the knowledge of the educated classes.

How unjustifiable and untrue the saying is, He who knows does not believe!—and that faith is no enemy to knowledge, and neither hinders nor obscures it, is shown by the names of the great scientists who were at the same time earnest Christians. It is quite incredible that belief in God, or in the immortality of the soul, or in redemption and the forgiveness of sins, should unfit one for an intelligent and accurate observation of nature. The materialist has no monopoly of scientific facts. We Christians are able to test them as well as he. There is no field which is not equally open to us. We, too, can make deductions, draw just conclusions, propound scientific hypotheses and systems, and test their worth. Faith, which stands altogether on a different footing, does not exclude all this. It is impossible to see why my being religious should prevent my discovering, with the help of a microscope, the cross-stripes on the *Pleurosigma angulata* or *Surirella gemma*; or my drawing accurate charts of the double canals in Mars by the help of the telescope; or gaining, like Liebig and Secchi, a deep insight into the starry worlds on high and the atom world of the infinitely small.

Experience rather shows that Christian faith favors a broad view, a correct appreciation of the ground principles. The historian of materialism, Albert Lange, himself admits that “it is not the most thorough students, the discoverers and inventors, the greatest masters, who busy themselves with the propagation of materialistic doctrines.” (Die Naturwissenschaft, Vol. II, p. 140.)

Many unbelievers have rendered great services to science in all its branches, also as specialists; but the

work of the great Christian students of nature has been, to a greater degree, epoch-making, has opened up more avenues, and has shed the light of science to greater distances. We will recount their names so long as our opponents persist in proclaiming the falsehood that belief is the enemy of science; for these names are in themselves a refutation of the falsehood. Great Christians and eminent men of science were: Copernicus, the founder of our modern world-system, a man of sincere piety, whose epitaph runs thus, "I desire not the grace which Thou hast bestowed on Paul, nor the mercy with which thou hast pardoned Peter: that which thou hast granted to the dying thief is all I ask;" Kepler, whose laws, together with those of Newton, form the basis of our astronomy, who concludes his most important work with the beautiful words: "I thank thee, Lord and Creator, that thou hast given me this joy in thy creation, this delight in the works of thy hands. I have proclaimed the glory of thy works to man in as far as my finite mind was capable of grasping thy infinity. If I have said anything which is unworthy of thee, or if I have sought after mine own honor, of thy mercy, forgive me!" the great Isaac Newton, a diligent reader of the Bible, and also of the mystic, Jacob Boehme; who uncovered his head at every mention of the name of God, and of whom Liebig says, "More light was given out by a single great genius, by Newton, than a thousand years before him were able to produce" (*Chemische Briefe*, p. 4); Linnæus, whom Professor Fraas designates as "acknowledged to be the greatest naturalist of all time, the creator of natural history as a science" (*Vor der Sintfleet*, p. 501), who,

on discovering inflorescence, cried out, delightedly, "I have seen the footprints of God!" Cuvier, the firm believer in the Bible, the founder of palæontology, according to Professor Quenstedt, the greatest zoologist of two centuries; William Herschel, perhaps the greatest of astronomers, who says: "The wider the field of science extends, the more numerous and indisputable become the proofs of the eternal existence of a creative and almighty Wisdom;" Leibnitz, the powerful thinker, as Dubois-Reymond calls him, and author of the hymn, "Jesu, whose death and suffering have brought us joy and life;" Euler, the great mathematician, who wrote in the year 1767, "A Defense of Divine Revelation Against the Objections of Free-thinkers." We may add, too, Lavoisier, who laid the foundation-stone of chemistry with his discovery of oxygen and oxidation, who writes in his "Traité de Chimie" (page 20), "With the creation of light, God poured out upon the earth the principle of organic matter, of feeling, and of thought." Büchner says of him, "Our whole modern science rests upon the law of the conservation of energy, as well as on the law of the conservation of substance, discovered by Lavoisier" (Die chemischen Elemente); and Liebig: "Since the discovery of oxygen the civilized world has undergone a revolution in customs and habits." Liebig, himself "the prince of German chemists," joyfully confesses, in his celebrated "Chemical Letters," his belief in God, and writes, "The chief value and glory of science is that it promotes true Christianity." (Chemische Briefe, page 41.) Then there is the great and yet eminently religious astronomer, Secchi, and also Mädler, the discoverer of the important fact that Al-

cyone, one of the Pleiades is the center of gravity of our solar system, a fact which has, for thousands of years, lain hidden in the Book of Job. (See Dr. Macmillan's "Bible-teachings in Nature," Chapter I.) Mädler's astronomy bears the motto, "The heavens declare the glory of the eternal God;" and he writes, "A true student of nature can not be an unbeliever: natural law and God's law are one and the same." Ritter, the greatest of geographers, exclaims: "The world is everywhere full of the majesty of the Creator." We must not forget, too, the great electrician, Faraday, who also held Bible-classes. How many men of science might be mentioned who were at least earnest, God-fearing men: Cartesius and the great Haller, Bernouilli, Brewster, Biot, Ampère, Quatrefages, Agassiz, Pasteur, etc.; and, in conclusion, let me add Robert Mayer, the discoverer of the unity of force, the greatest scientific discovery of this century, who exclaimed to a science congress at Innsbruck, "Out of the fullness of my heart I cry, A right philosophy ought to be, and can be, nothing else than a propaganda of the Christian religion." (*Die Mechanik der Wärme*, p. 318.)

In face of such facts the materialist ought, instead of calling us obscurists, to thank us for the brilliant torches which we Christians have lighted for him, and without whose light he would be centuries behind.

This scientific faculty among Christians shows up more brightly when we consider how greatly they are in the minority in the world. The supposition that, in Europe, they are outnumbered a hundred-fold by non-Christians is probably within the mark. The few Christians, then, have, during the last century or two, done

far more for science than the non-Christians. Faith conduces more to an understanding of Nature than unbelief. What becomes of the declaration that it is the enemy of science in the light of facts?

From the facts it becomes evident that the Christian faith, like science, rests upon clear and positive facts. It is true that it is a favorite notion nowadays that a man may be intellectually great and small at the same time, both true and false; a noble man and a swindler; a great mind in one field, in another weak; and that prophets and apostles, for instance, in spite of their dominant personality and the power of their world-conquering words, were unreliable, irresponsible enthusiasts, incapable of discriminating between a miracle and the simplest natural occurrence; or that, notwithstanding the beauty and loftiness of their moral teaching, they were cunning impostors, who deluded the world into a belief in miracles, such as the resurrection of Christ, which never took place. We believe that a great mind may make mistakes, but not that it is possible to be in one domain a great, deep, and logical thinker, and in another narrow, confused, and irrational. We can not conceive that a clear and powerful intellect like that of Newton could suddenly believe all kinds of absurd nonsense as soon as he came within the province of religion; but we believe that also on this subject his great mind tested and proved. We know that Paul, Augustine, and Luther were not the men to accept anything hastily, without due and careful examination.

It is astonishing how many Christians listen abashed, and without a word of reply, to the taunts of their op-

ponents that their belief shuns the light, rests only upon a more or less obscure sentimentality, and not, like science, upon clear, indisputable facts, etc. It would be, to say the least of it, very remarkable and totally inexplicable that a belief which shuns the light should have conquered the world, and compelled the chief nations of mankind to profess Christianity, if only in name. Did the apostles at Ephesus, at Athens, before the high-priests at Jerusalem, before pro-consuls and Roman emperors, shun the light of publicity? Or was it the case with Calvin at Geneva, or with Luther at Worms? Are the Epistles of St. Paul full of emotion and sentiment, or do they contain, in clear and logical, if impetuous language, a justification of that faith to Jews and Gentiles?

The cross now reigns from the North Pole to the South, from east to west; and if you were to land on Spitzbergen or at the Cape of Good Hope, the crosses on the graves would show you that there, too, men believe, or profess to believe, in the Crucified. Can any one soberly believe that there is nothing in this greatest phenomenon of the world's history? We are to credit that a delusion, dreams of self-deceived enthusiasts, sufficed to lift the Old World off its hinges, and to revolutionize the thoughts, views, and opinions of civilized humanity. Or is it possible that the thousands of Christians who, since the Apostolic age, have preached the gospel, all the missionaries—like Egede, the apostle of the Greenlanders: Gützlaß, of the Chinese; Zinzendorf, Williams, Krapf, Moffat, Paton—those heroes of self-sacrifice and self-denial and true humanity, would have wandered over the heathen world, borne

hunger and thirst, dangers and privations innumerable, nay, in many cases, have suffered a cruel death, merely in order systematically to deceive the poor, ignorant savages, to prejudice them against the light of science, and to establish over them a sacerdotal sway? Such imputations are their own condemnation.

From time to time it has happened that error has done a great work; but on careful consideration it will be found that it derived its strength from the measure of truth bound up with it. Mohammed, for example, whom many misjudge on the strength of legends of later date, this Moses on his own account, whom God gave to the wild offspring of Abraham, the sons of Ishmael, in order to raise them from the worship of idols and moral depravity, to become afterwards a destruction to heathendom and a scourge to degenerate Christendom, is a case in point. The truths which gave into his hand the sword with which he was able to subdue millions, and spread his doctrines within two centuries from Delhi to Granada, were that he preached the one God who created heaven and earth, and who will, one day, judge the world, and called him the Merciful; that he commanded justice, prayer, and almsgiving; that he proclaimed, What God sends, were it death, and worse than death, is good and best. Allah akbar! God is great! The lie, the falsehood which is wholly false is powerless and unproductive of great results. Let any one try to accomplish anything in the world by preaching that $2+2$ is not 4. Carlyle says: "A false man found a religion? Why, a false man can not build a brick house! If he do not know and follow *truly* the properties of mortar, burnt clay, and what else he works

in, it is no home that he makes, but a rubbish-heap. It will not stand for twelve centuries, to lodge a hundred and eighty millions; it will fall straightway." (Heroes and Hero Worship. Mahomet.)

On the contrary, the Christian religion, like science, is founded on clear, daily-recurring facts, easily recognizable by an impartial observer. Is it not a fact, and does not every village church and the great cathedrals of Cologne and Canterbury, Notre Dame and Milan, St. Peter's at Rome, bear silent yet eloquent witness to the fact that, with a few words, without arming one man in his cause, without writing a line, without the expenditure of one coin, an obscure carpenter's Son, who spent a few years in a distant province of the Roman Empire in the company of beggars and fishermen, misunderstood by his own countrymen, despised by the rich, the learned, and the mighty of this world, and who, finally, died a death of shame, has conquered the world? This is a proof which so impressed Napoleon I that, on St. Helena, he made the confession, "Jesus is truly the Son of God." In accordance with the law of nature, which, men of science tell us, is eternal and unchangeable, *causa æquat effectum*—the cause is equal to the effect—the cause of such a tremendous effect, Christ himself, must have been of extraordinary greatness.

Let some one try and start a crusade in the cause of materialism—say, on behalf of the eternity of matter or the evolution of the primal germ—in the same way, and making use of the same weapons as Christ, and see how he succeeds.

Is it not an historical and authentic fact that thousands of martyrs under torture, and millions of Chris-

tians in ordinary circumstances have died and are dying daily in joy and confidence, rejoicing in their faith in their God and Savior, although they, like other men, are attached to wife and child, earthly possessions and life?

It is therefore undeniable that, with the faithful acceptance of the gospel, there comes to man, or starts to life in him, a power which was not there before. It was this which so astonished the Roman pro-consuls in the tortured Christians. One of them, who had failed to wring even a sigh from a youth dying in agony, exclaimed, "We are conquered!" The presence of a power which can make a drunkard sober, vice virtuous, haughtiness humble, and a thief honest, is an acknowledged, undeniable, and, therefore, scientific fact; and to explain away these facts by the words "madness" and "delusion" is to act, to say the least of it, most unscientifically.

A power is a power; and those of the spiritual world—nay, they especially—obey definite laws, do not originate in nothing and vanish into nothing. Here, too, the statement holds good, No effect without a cause, and no cause without effect; and science must here take into account a cause unknown to her, but none the less real, instead of contenting herself with a contemptuous negation. Where a force is manifest in nature, we can only bend to the fact; after that we are at liberty to let it alone and go our way, or to study the phenomenon, the manner of its appearance, and its results, its cause, or causes.

A scientific fact, say our opponents, must be capable of being called forth at any time, and tested to its genuineness. Disregarding the merely partial truth of this

assertion, which only holds good within the sphere of human experience, I ask, What right has any one to deny the genuineness and truth of the facts experienced daily by me and thousands of Christians—the fact that, in answer to earnest prayer, we receive comfort and strength, that we could cite thousands of instances of a plain and often immediate granting of our petitions? If the unbeliever says that he knows nothing of such a thing, the first question is, whether he has ever made the attempt, under all the necessary conditions; for, without these, not even a scientific experiment succeeds. If he has not done so, he is incapable of judging whether there is any truth in the matter. And even if he should say he had tried it without any result, that is no more a proof that I am under a delusion than if one suffering from color-blindness were to tell me he had often looked through a prism, but had never seen any of the brilliant colors which I had told him were to be seen.

“Blind belief,” says the blind unbeliever, not knowing that faith is the clear beholding of a higher world. Faith is intuition, and this, as daily experience and history teach, is higher than deduction. But belief has often deceived. Yes, a false belief and scientific proof still more often. How much that is false and incorrect, how much nonsense, has been and is daily proved clearly and conclusively! For, as the old sophists knew, everything—and nothing—is capable of proof.

The world of faith is like the cloud-world which floats, beautiful, soft, plastic, intangible, and yet materially existent, high above the hard, fast-bound surface of the earth, sailing hither and thither, towering in the light of sunset to palaces of purple and gold. Many

think lightly of this airy fabric; and "to live in the clouds" seems but a poor and worthless kind of existence to the man of the world, engrossed in the stern prose of the struggle for existence. But unless this upper world drops her gentle, beneficent rain upon the hard, rough earth beneath, the arduous labors of the husbandman are all in vain. Without these higher forces we are unable to live; we droop and perish. Let them, however, break loose in all their strength, let the destroying lightning-flash dart from the cloud, while the thunder-peals and the waters on high gather themselves together and rush violently through wood and field, sweeping before them, with irresistible fury, man and his works,—then even the worldly man recognizes the presence of a Power enthroned high above his commonplace wisdom, and fears.

Only a man spiritually blind can overlook the enormous effects of faith as a Divine and unbelief as a diabolical power in the history of humanity. St. Paul describes the former for us in his *Epistle to the Romans*. The latter has been the cause of the persecutions of Christians in all times, and also of the rage and hatred with which materialists and anarchists strive to eradicate all belief at the present day—in itself a tacit acknowledgment of its power. Both belief and unbelief, surging and raging in the hearts of men, have, in all ages, inflamed them against one another; for Christ said, "I am not come to send peace on the earth, but a sword." And to refer this opposition in history to the conflict between two mighty spiritual principles seems to me a more rational and scientific proceeding than to ascribe such great consequences to hallucina-

tion, as the materialist does in representing faith as a delusion, as if such could have the power to agitate humanity and the world!

We Christians explain the order of the universe by assumptions which even our opponents regard as admissible—that, for example, of a living and personal God, who, as *causa causarum*, created this universe. When Professor Haeckel (*Natürliche Schöpfung*, page 28) declares himself unable to comprehend “the ultimate and highest Principle,” he admits the existence of such a thing; and it is just this highest Principle which we call God. Albert Lange says Professor Haeckel regards spontaneous generation as a necessary hypothesis, which is, however, not yet absolutely established. “If you do not accept the hypothesis of spontaneous generation,” he writes, “you must take refuge in the miracle of a supernatural creation.” (*Die Naturwissenschaften*.) As it now happens that Pasteur and others have finally disposed of the theory of spontaneous generation, we follow the advice given, and are acting in accordance with strict science in accepting the dogma of a supernatural creation.

We maintain further that, at one time and from one cause or another, a separation took place between creation and Creator, and that our spiritual life has become, in consequence of this separation, turbid and obscure, hindering us from recognizing the origin of creation outside and inside ourselves on the one hand; on the other, overshadowing our whole life with the consciousness of something not as it ought to be. Philosophy arrives at the recognition of this truth by its own unaided light. Buddha says: “This is Sansara;

it is the world of birth, of sickness, of old age and death; it is the world which ought not to be;" and Schopenhauer, who, in general, ridicules the Bible, confesses, "The story of the Fall is the only thing which reconciles me to the Old Testament; for our existence resembles nothing so much as the consequence of a false step and a punishable lust."

We put forth the dogma of sin pursued by a Divine Nemesis as the principal cause of the misery of human life, of which old Homer sang, "There is nothing more miserable upon the earth than man of all that breathes and moves." In this view we have the support of the great tragic poets of all ages, who look deeply into man's nature and man's life. They confess, one and all, "Life is not the greatest good; but the greatest of all evils is sin."

The dread and anxiety, of which Schelling says, "Anxiety is the fundamental feeling of every living creature," we attribute to the existence of an evil Power, which is forever threatening us with destruction, who goes about "like a roaring lion, seeking whom he may devour." The materialist, on his side, is unable to urge any ground for this feeling of dread.

The wonderful fitness and utility, the adaptation to purpose of the universe, which is even acknowledged by some materialists, we explain by the creation and rule of a beneficent, all-wise God, with a purpose in all he does. Is not this doctrine more natural, more satisfactory, more in accordance with facts, and, consequently, more scientific, than Spiller's explanation of it as the action of an unconscious and yet wise, just, and infallible universal ether?

As regards death, of which the ancient Greek said, "The most terrible thing in the world is death," and which science is unable to account for, we say with the Bible, "Death is the wages of sin, but everlasting life is the gift of God." In this we are in agreement with the view of all nations, and once more it is corroborated by Schopenhauer, who writes, "That our life itself implies a transgression is proved by death," and adds, "Nothing is more certain than that the great and manifold sufferings of the world are the consequence of the world's exceeding guilt."

What right, then, has the world to accuse us of believing without knowing, and to boast of knowing, but not believing, though it does not know how the grass grows? As science sets up the dogmas of the mathematical axioms, of the atom, of vital force, in explanation of the forms of bodies, their properties, and their manifestations, we set up, in explanation of facts as undeniable, as historical and authentic, and otherwise inexplicable, the facts of repentance and remorse, of the fear of death, and the necessity of redemption, of answers to prayer and a happy death, the dogmas of a holy God, of sin, of a Savior, Jesus Christ, of redemption by his death, and of eternal bliss. Thousands of earnest, clever, gifted souls, like the above-mentioned men of science, like Augustine, Calvin, Luther, and so many others, have testified, and are still testifying, that they have found, after a lifelong trial of them, that these dogmas alone satisfactorily explain the universe, life, and humanity. Many, indeed, have sealed their conviction with their blood.

Or are we Christians alone not justified in making

the inexplicable the basis of our views? Are we not rather bound, according to the strict method of science, to hold to this hypothesis, as our opponents call it, till they provide us with a better explanation of existing things?

How little able they are, however, to do this! How little satisfactory their reading of the world-questions, even scientifically considered! How halting and uncertain their conclusions! And how much blind faith they demand! How unfruitful their doctrines have been in the life of the individual and the history of nations we shall see in the next chapter.

CHAPTER V

Materialism

WE will now pass from science to that view of existence and the universe originally taught by Democritus, and now so common in certain circles under the name of "materialism"—a system which some wrongly believe to be real science.

Materialism maintains that the only thing which exists is eternal, indestructible matter, with its manifestations or forces, and that the highest phenomena of life are only such manifestations of matter. The universe is, according to this theory, nothing but the motion of atoms, all knowledge only the understanding of this mechanism of atoms. Matter, they say, explains itself, and also all the phenomena falsely ascribed to spiritual agency; consequently the assumption of the spirit is superfluous, and, like everything which is superfluous, injurious. A position which is certainly alluring in its simplicity! But whether it is in agreement with the world of facts; whether matter explains itself, or does not rather point to something beyond and outside itself, even in the animal, as in pain and in maternal love; whether it explains the whole intellectual and spiritual life of man and mankind, with their poetry and their yearnings, their achievements and their aspirations, is what we will now take as our subject of consideration.

If we look at this opinion, as propounded by Büchner, Vogt, Huxley, Moleschott, Spiller, Haeckel, Hartmann, and many others, we soon recognize that here we have not to do with pure science, which concerns itself only with data, with the unprejudiced observation of nature within the limits defined by Dubois-Reymond, but with a mixture of science and speculation, with a system which we might call the religion of unbelief, as recently published by two representatives of the doctrine under the title, "Confession of Faith of a Modern Man of Science."

Strange to say, the chief article of these opponents of all religion is a negatively religious proposition, "I believe that there is no God." This assertion is no scientific dogma, because unproved and unprovable by any fact in the universe. One would need to search long in chemistry and geology, in astronomy and zoology, in spectrum analysis and in micrography, would need to study creation through telescope and microscope to all time, before one found a fact, a form or phenomenon of matter—and the materialist believes only in matter—which could prove that there is no God. What would be the nature of such a fact? How is it possible for the positive and absolute to explain by its existence the non-existence of something independent of it? It would be remarkable that so many clear-sighted students of nature should never have unearthed such a fact or facts, and it is still more remarkable that no materialist can cite any definite fact in science in proof of the above assertion.

We will not go into the numerous utterances of great and wise men who have, in all times, acknowl-

edged, like Humboldt, "that history is not intelligible without the idea of a Higher Governing Power," but content ourselves with maintaining that the proposition, There is no God, is incapable of being scientifically proved.

But because deep in the human soul is inscribed the commandment, "Thou shalt worship," materialism sets up a dead god in the place of the living God of the Bible, and says, "I believe in eternal matter, from which all forces proceed, which has of itself created all things, which knows nothing, and yet comprises in itself all knowledge." And with the same intolerance and dogmatic assumption of infallibility with which the materialist reproaches Christians he demands absolute and unconditional belief in his idol. Let us hear what Spiller, whom Dr. Müller designates "one of the greatest natural philosophers of all time," has to say about his god, the primordial substance which he calls "universal ether" (the italics are Spiller's): "God is an infinite, eternal—*i. e.*, uncreated and indestructible—*material substance*, namely, the *universal ether*. This is the *Creator* of heaven—*i. e.*, the heavenly bodies—and the earth. It also created *us men*; it governs the whole world; *it is eternal*; *it is all-wise*; *it is just*; *it never errs*, and is alone infallible because it acts *without self-consciousness and without any fixed purpose*" (Gott im Lichte der Naturwissenschaften, p. 120); and on page 84 he declares, "*The soul is the reciprocal action of the atoms of organic bodies and the universal ether.*" This is simply laid down as a statement. At the same time Spiller expresses the hope that, with the discovery of this universal ether, he has "knocked the ground from under

the priests' feet," and abuses other materialists who make coarse, visible matter the all-father. Büchner's assertion, "Matter is the mother who bears all, and draws all back to herself," is to him a materialism not to be entertained (p. 67); and he says, "When Diderot talks of matter thinking, one's thoughts fail." (*Das Leben*, p. 21.) He makes merry over Hartmann's "Unconscious One," a truly inconceivable notion, "the material spirit not yet conscious of itself, whose sole aim it is to attain to consciousness," calling it "a vague image of the fancy," and crying to it, "Material spirit, take off thy mask!" (*Das Leben*, p. 11.) Hartmann writes of his idol, "The Unconscious One," almost identically (the italics are his): "*The Unconscious One is never weary. He does not waver nor doubt, requires no time for consideration, and never errs. He possesses no memory; yet in him will and idea are bound up in indissoluble unity. (!) The Unconscious One is almighty, all-present, all-knowing, and all-wise.*" (*Philosophie des Unbewussten*, Part III, pp. 310-316.) Here we have dogmas against dogmas!

There is one point, however, on which these men are agreed, and that is that the Christian dogma of a living God, from whom all life is derived, who created, with clear consciousness of himself and his design, the universe for a particular purpose, and is carrying it forward to a predetermined destination, is altogether untenable.

Besides, the dogma of the absolute justice and absolute wisdom of the universal ether—the unconscious one, or eternal matter, whichever they are pleased to call it—contradicts the other dogma of the materialist,

that there is no future award of recompense and punishment; for even they will not deny that very often in this world virtue does not meet with its reward, nor vice with its punishment. If, then, there is no justice in a future world, the universal ether is unjust.

The materialistic belief in the eternity of matter is as unscientific as the first position of the non-existence of God. Not only can it be neither proved nor grasped, but it stands in contradiction to our direct impressions and to the logic of facts. The universe, like a growing child or an unfolding plant, bears the stamp of incompleteness, of youth, of growth, of an evident striving after a goal not yet attained. The materialist himself teaches that, according to the hypothesis of Herschel, Laplace, and Kant, millions of years ago, all matter was uniformly diffused in an intensely rarified state, and that, in the thousands of nebulae, whose light takes perhaps millions of years to reach us, we may see the primary germ-state of the universe. How does this idea of a primordial condition fit in with the eternity of matter? The materialist tells us, too, that man, in the course of comparatively few centuries, has developed from an animal, and that the earth is a relatively new body, still undergoing a period of evolution. Do not the ideas of eternal existence and evolution mutually exclude one another? If we were told that a certain child was growing daily, and had been doing so from all eternity, the first thing we should ask would be, "Why, then, is it not yet full-grown?" If we have been developing from all eternity, why are we not yet fully developed? If matter is eternal, all possible forms and manifestations of matter must have been exhausted

millions of æons ago. All forms of existence must have been repeated infinitely often, and I must have sat an infinite number of times at the same table, writing and thinking the same things; for though we can think of matter as infinite in quantity, it can, according to the laws of nature, have only a certain number of qualities, and can, therefore, only occur under a limited number of forms. This endless and purposeless repetition, which is the logical outcome of the belief in the eternity of matter, is contradicted by facts. What we call life is the play of forces constantly striving for balance. This equalizing process is constantly taking place; for instance, when a hundred million suns pour out incessantly into ice-cold space a heat which never returns to them. Why, if that has been going on throughout eternal ages, is space not yet warmed through; and why have not all phenomena of heat long ago ceased?

The materialistic dogma of the "entropy" or ultimate death of the universe contradicts the eternity of matter, for this entropy ought to have long since occurred; and when it has once taken place, it is impossible, according to the law of the inertia of bodies, that matter should of itself pass from a state of rest and equilibrium into that of motion.

It is true, some cosmologists tell us that eventually suns falling one into the other will, by the conversion into heat of the force of their impact combine to form a dazzling, glowing nebula, a cosmic gas, and thus restore the original heat, whereupon the world-forming process can begin anew from the beginning.

These are, however, false conclusions. No doubt,

one principal source of heat is the combination of masses of matter. It is doubtful whether it is the only one. But if we suppose that the moons will fall into their planets, the planets into their suns, and these suns into others, we must conceive of it, not as happening at one stroke, but in succession. Mercury would fall first into the sun, and would feed this furnace for six years and two hundred and nineteen days (W. Thomson); but at the end of this time this heat would have been dissipated by radiation into space without raising its temperature one thousand millionth of a degree. Then comes Venus, which would sustain the heat of the sun 83 years, 326 days; then the earth, sufficient for 95 years, 19 days; Jupiter would provide for 32,254 years, and so on. The fall of all the planets would maintain the sun's heat for not more than 45,600 years. But between each fall the sun would give out far more heat than he received; so that, to continue the thought, the heat generated in that way would be constantly disappearing in space, and, when, finally, after the consumption of their moons and planets, the suns, having by this time approached each other very nearly, fall into one another. The greater part of the heat-capital necessary to the formation of new worlds will have long been exhausted and as good as lost. After a short fire-work display produced by the conflagration of several millions of suns—which, however, does not exclude the possibility of the formation, in the meantime, of smaller nebulae having the same issue, the whole of universal space will congeal to everlasting rest at a temperature, not of -273° C., as Spiller holds, but of barely -150° . If this is the logically scientific end of the universe, we

ask again, "Why has not matter long ago died this natural death?"

The celebrated astronomer, Secchi, speaks in the same way: "We have here to do with a space of time by no means unlimited. Were it so, the activity of the world would have long since been extinguished. The cause of changes is the difference of energy in the different regions. And as this energy is continually striving to equalize itself, if an unlimited time had already elapsed, universal equilibrium would long ago have set in and made every phenomenon impossible." (*Die Sterne*, p. 335.) The truth of this is admitted even by Hartmann: "It would not be in accordance with the idea of evolution to ascribe to the world-process an infinite duration in the past; for then every conceivable stage of development would already have been passed through, which is certainly not the case; and just as little can we predict for it an endless duration in the future, for in that case there would be an end to the notion of a goal of this development, and the world-process would resemble the sieve of the Danaides." (*Philosophie des Unbewussten*, p. 747.)

Thus many materialists admit that the universe is the result of a process in time, and that the present condition of matter and force must have had a beginning, and may be expected to have an end. That, however, is simply the Bible doctrine; and the position, "In the beginning God created the heaven and the earth," is more scientific, because more in accord with the universe as we know it than the doctrine of the eternity of matter. This God is to us Christians the Center from which the forces of the universe eternally proceed

and are hourly exerted. He is the *Perpetuum Mobile* of the universe, for which reason we have no fear of the setting-in of an equilibrium of all energies and the consequent death of the universe.

To be logical, the materialist ought to tell us, before he lays down the doctrine of the eternity of matter, what matter is, this wonderful, well-known, and yet unknown something, his one and all, according to him the only entity. But he can not tell us because he knows no more about it than we non-materialists. His altars, like those of the Athenians, are erected to "the Unknown God." Some men of science substitute for the idea of matter that of energy, and think "to possess in the idea of energy all that is necessary to the comprehension of things." (?) Man can not, however, dispense with the notion of matter as long as he lives on earth. He can not see and grasp energy, only matter; and again and again he asks, What is this matter? We have seen that on this point Dubois-Reymond utters his *Ignoramus* as the sum-total of human knowledge.

To go further into the materialists' "Confession of Faith." The next article runs thus, "I believe in the eternity of forces or force." The materialist, however, confesses, and every student of nature must admit, that we do not know the nature of force or forces, nor whether they are inherent properties of matter or not. Spiller says, "My standpoint is not the false one of Moleschott, Büchner, and others, who hold that ordinary matter bears in itself the principle of force and motion." (Das Leben, p. 40.) Elsewhere he says: "When Spinoza assumes the inseparable unity of matter and force, he is under a mistake. Deeper investi-

gation shows that force does not originally exist in matter as an inherent property." What is force, then? Dubois-Reymond, as we have seen, believes that is one of the things we shall never know on earth. He even thinks it possible that there is no such thing as force or matter, but that they are only abstractions. Schleiden writes: "Force and matter are nothing but the product of our senses; in themselves they do not exist." (!) (Das Meer, p. 117.) And Hartmann exclaims, "Matter is a chimera!" How can one say of a thing, whose nature is unknown, of an abstraction which exists only as an idea in my brain, or through my senses, that it is eternal? It is true, we see how, on earth and, in all probability, throughout space, force is indestructible; but that may only hold good during the existence of the present universe, and not for eternity. It is really laughable to think of creatures who are here only for a second in space, a nothing of eternity, maintaining boldly and presumptuously, Matter is eternal; force is eternal. How can we know? Whence can we know? What do we ephemeral beings know of eternity, that something which our minds are powerless to grasp? To admit the Infinite into our calculations is to quit science for metaphysics. Then everything becomes possible, and a microbe devours the universe!

This dogma of the eternity of force has also no scientific foundation, and is, in reality, a convenient refuge, a cushion for the head weary of thinking. If one can not find a beginning, or believe, or understand, the simplest thing is to say, "It is eternal," and rest content with that.

Just as unproved are the teachings of the material-

ists as to the origin of life. Their answers to the question, "What is life?" are highly unsatisfactory. "Life, in the widest sense of the word," says Spiller, "is motion or change of place." A broad definition in truth! For Professor Haeckel vital force is "the simple causal law" or "the direct action of the existent substance of the individual." Does any one understand him? Bernard (speech at Chicago, 1874) says: "The vital principle is the something which makes plants grow." Simple, but not exactly an explanation! Hartmann considers it necessary for vital development that "the metaphysical subject of the plan of evolution is itself immanent in the process as instrument of the intentional development according to fixed laws." To Schopenhauer all life is only "will." Whose? When Herbert Spencer defines life as "a continuous adjustment of internal relations to external relations," we might reply that it consists much more in a struggle against these relations and a continual overcoming of them. We all feel that life is neither a mere adjustment nor a mere struggle, but an individual, and, according as each one conceives of it, an individualizing force. When, in *Natur* (February 3, 1895), the question, "What is life?" is answered, in agreement with Spiller, as follows, "The observer who stands on the highest step of science will at once answer, Life is nothing but motion," remarking further that natural science has had to travel far in order to be able to give this answer, we can only regret that it should have traveled to no purpose; for life is no more mere motion than motion in itself is life. A dynamo which, full of force, heat, and electricity, emitting sparks, rotates many hundred times in a minute, is,

for all that, dead; the tiny black seed, which has lain all winter on my window-sill, motionless and apparently dead, is alive.

Not so very many years ago almost all physiologists and men of science held that the supposition of a vital force was unnecessary, maintaining that the forces acting in organisms were the same as those of inanimate nature. Since then, however, the pendulum has swung back, and vitalism has once more come to the front. Schopenhauer had already written, "He who denies the existence of a vital force denies his own existence, and may congratulate himself on having reached the acme of absurdity." Professor Carrière says, very much to the point, "Robert Mayer's discovery of the conservation of energy does not hold good for the animate world, where the organic or vital force and the spiritual force are the sources of energy." "The more minute, many-sided, and thorough our investigations of the phenomena of life are, the more we are forced to the opinion that processes which we have hitherto thought to explain physically and chemically are of far more complex nature, and, for the present, defy all elucidation." And, in truth, capillarity and endosmose do not explain the absorption of nutriment by plants, nor their power of distinguishing the harmful from the beneficial, nor their elaboration of the latter to wonderful products of various kinds, nor the transformation of leaves into flowers of certain colors. Why is the rose red and the cornflower blue? There lie two grains of wheat. The one is capable of germination, is therefore living; the other is no longer so, is therefore dead. Where is the physical or chemical or other difference between

them? Who saw, weighed, or measured the vital principle, the tiny soul, as it fled from the one? The much-vaunted chemical synthesis of many organic substances—madder, for example—is not all that could be desired. In 1893, at the Congress of Painters in Munich, the cultivation of madder was advocated, that a good color might be obtained; for that artificially made was not durable. The latter is, then, not exactly the same as the natural product, however well the chemical formula may correspond. The most wonderful and inexplicable point in nature is, perhaps, the transmission of quality through the seed. The bean, for instance, preserves the tendency to climb from right to left, while the hop turns from left to right.

If we inquire of the materialist, "Whence comes organic life?"—although Liebig, Pasteur, and Tyndall have, by oft-repeated and careful experiments, finally banished the theory of spontaneous generation from science—he will nevertheless require us to believe that it once took place on earth, and that organisms originated through an accidental combination of inorganic substances—an idea which is at variance with all scientific fact, and which, as Darwin admits, has never been observed—nothing less than a miracle in fact. We saw in the last chapter how Professor Haeckel speaks of the "as yet unproved" theory of spontaneous generation as absolutely necessary *"if we do not wish to see ourselves forced to the assumption of a supernatural creation."* The materialist, then, can only save his non-belief in God by the belief in something which is unproved, and which science has proved to be impossible. The materialist, Büchner, teaches that "the cell bears

the origin and principle of its life in itself;" and the equally eminent materialist, Spiller, retorts, "That is incorrect, because a force is not capable of self-generation." (Das Leben, p. 55.) Sir William Thomson (Lord Kelvin) is of the opinion that an act of creation *on the earth* is not necessary; for life-germs may quite well have fallen on the earth from other worlds. As if the question were thus disposed of! How did they originate on those other worlds? And why do not germs of new and wonderful organisms still fall upon the earth from other spheres? Spiller—we prefer to let our opponents answer one another—says on this subject: "The dust of infusoria can not be transported from one world to another. Meteorites could not carry organic life because they are in a glowing state in the atmosphere. If a planting of the earth with organisms had been effected by means of meteorites, it would have occurred only here and there, at various centers, which is in opposition to all known facts." (Das Leben, p. 27.) Others are of opinion that the germs were contained, like all life, in the primitive nebosity under the form of hydrogen atoms. Tyndall, as we have already seen, believes that feeling, reason, will, in all their manifestations, "were once latent in a fiery cloud." And Zacharias, too, is inclined to place "the origin of life in the womb of the primal nebula in space." The how of this theory transcends imagination. Others believe that these germs endured without suffering destruction the 2,000° of heat on earth during the molten-granite period. Others, again, maintain that the extreme cold of cosmic space kept them alive in a frozen condition. But whence they came they do not tell us. Fechner

writes, "Organisms did not originate in a protoplasm, but in a mighty being of most complex structure, which was split up into a great variety of different creatures, the first parents of the present species." (Spiller: *Das Leben*, p. 49.) A return to the Scandinavian giant, Ymir! Extremes meet!

The materialist can only set up unproved and unprovable theories as to how thought and consciousness were evolved from organic life. Hartmann conceives consciousness, the presence of spirit in matter, as "a stupefaction of the unconscious will in regard to the existence of ideas present, independent of that will." Let him comprehend who can! Vogt and others believe that thoughts are a secretion of the brain—substance—although thought does not possess *one* quality in common with matter; therefore such a generation of thought is in opposition to the laws of chemistry. Liebig writes on the subject: "These children in the understanding of nature's laws maintain, and wish to make a skeptical yet credulous public believe, that they are able to give an explanation of the origin of thought, of the nature and essence of the human spirit. The spiritual part of man, they say, is the product of his senses. The brain produces thought by material changes, and stands in the same relation to them as the liver to the gall. If we divest the conclusions of these persons of their borrowed tinsel, of their apparent proofs, all that remains are the facts that our legs are given us to walk with, and our brain to think with, and that we can not walk without legs nor think without brains. The flesh and the bones, however, do not move themselves, but are moved by a cause which is not flesh

or bone. These are only the instruments of force. The brain is the agent of the cause which produces thought." (Chemische Briefe, p. 369.)

Farther than this the modern biologists and physiologists—Huxley, Claude Bernhard, Bichat, Virchow, and others—with all their scientific knowledge, experiments, and vivisection, have not been able to get. What life is, why and how the muscle produces force, the nerve feels, and the brain thinks, and how and why cells so similar develop energies so difficult, are still mysteries. An article by an authority on the subject in a scientific journal, after touching on the labors of Golgi, von Kölliker, Retzius, Waldeyer, Forel of Zurich, and others, and on the theory of nerve-centers and physiological unities, goes on to say: "We are still in the dark as to the course of mental processes in the brain. We are acquainted with certain special functions of the brain which are connected with certain centers of the brain-mass—*e. g.*, the seat of the faculties of speech, sight, etc. But the means of conduction are not clear to our sight, and the way in which the ordinary processes of the thinking organ, the sensations and thoughts, are carried on, is entirely unknown to us."

It is a curious fact in connection with the brain that, while a slight injury to the surface will cause serious disturbances in the entire organism (apoplexy, etc.), a severe wound or other internal failing may often exist for years without any ill effect on the activity of the brain. Celebrated psychologists, like Esquirol, Pinet, Fabret, and others, have shown that insanity is by no means necessarily connected with organic disturbances in the brain. On the contrary, Cuvier, Rubinstein, and

Helmholtz suffered in their youth from water on the brain. In twenty cases of acute madness, says Lélut, there were at least seventeen normal brains. In the case of long-continued injury, however, alternations of madness and sanity have been observed. It has happened, too, that the madness has suddenly disappeared before the injury had healed. Esquirol is of opinion that changes in the brain occur only when the nerve-centers of motion and feeling are also affected; not, however, in cases of purely intellectual insanity. The theory of Moleschott and Feuerbach, that the amount of phosphorus in the brain is the criterion of the thinking power, and that too great a quantity of phosphorus causes madness, is not satisfactory. Lassaigne found that the brain of a lunatic does not contain more phosphorus than that of an intellectual or a stupid person, and that the brains of fishes, which have no great reputation as thinkers, contain a great quantity of phosphorus. The pathological anatomy of the brain, the greatest authorities tell us, is full of mysteries and anomalies.

We have by no means exhausted the articles of belief for which the materialist demands as blind a faith as that with which he reproaches us Christians. If the universal ether of Spiller was marvelous, that eminently subtle substance, thinking logically and of set purpose, though quite unconscious of doing so, all-wise and all-just through no will of its own, there has arisen a yet stronger than Spiller. The philosopher Avenarius some time ago prophesied that it would become necessary "*to allow the possession of consciousness to the atom.*" This bold step has now been taken by Professor Haeckel.

He has discovered that nothing is to be done with soulless matter, and that it explains neither the world nor life, neither consciousness nor heredity. In his work, "The Perigenesis [wave-motion] of the Plastidule," he requires that we should imagine all matter as animate, and think of every atom of the mass as provided with a constant and immortal atom-soul. We have thus returned to the once-discredited "soul," or, in other words, to spirit! "As the mass of atoms," he says, "is indestructible and unchangeable, so is the atom-soul inseparably bound up with it eternal and immortal. The motion of the atoms in the formation and dissolution of a chemical combination is only intelligible *if we ascribe to them feeling and will.*" Thereupon he boldly states the following arbitrary propositions: "If every atom is endowed with feeling and will, the plastidule (organic molecule) is distinguished from them by possessing memory. *All plastidules possess memory. This faculty is wanting in all other molecules.*" The faculties of imagination and the formation of ideas, of thought and consciousness, of practice and habit, of nutrition and propagation, are based upon the function of the "*unconscious memory.*" (!) "*Heredity is the memory of the plastidule, variability is the comprehension of the plastidule.*" (!) "The former causes the constancy, the latter the variety of organic forms." All propositions resting on faith alone!

What an amount of feeling and will there must be in a pinhead which, as we saw in Chapter II, contains, according to Gaudin, so many atoms that it would take 250,000 years to count them; what an amount of thought in a match whose millions and millions of mole-

cules unconsciously remember everything they have experienced since they became "plastidules!"

The materialist is here juggling with words and hypotheses which explain nothing. Do we know anything more about thought; can we form a clearer idea of it if, doing away with the human soul, we assume in every organic molecule a thinking and memorizing soul? Evidently not; we have arbitrarily supposed the existence of several billions of superfluous souls, and are none the wiser.

Dubois-Reymond ridicules the notion: "The supposition, which I made as *reductio ad absurdum*, that the individual atoms are endowed with consciousness, Professor Haeckel propounds as a metaphysical axiom! If atoms feel, what is the use of the organs of sense?" (Die sieben Welträtsel, pp. 78, 79.) Spiller too declares: "The attempts to explain organic vital processes by means of the unproved and unprovable animation of individual atoms seem to me quite hopeless." (Das Leben, page 9.)

Is there not a Divine irony apparent, is not God laughing his detractors to scorn, when the very men who will have nothing to do with him as the great God who fills the universe are ultimately forced by their own science to endow the atom, the smallest particle of matter, with unthinkable and incomprehensible energies, to exalt it as the great Original, the eternal, the *causa causarum*, and to prostrate themselves before the tiny idol? And the men who would have us believe in a thing so inconceivable are they who proclaim loudly that they only believe what they can see, what they can grasp and comprehend, what can be proved, what is in

accordance with fact, what can stand before the tribunal of pure Reason!

Truly our Christian belief can vie boldly with this pretended science of materialism in clearness, in logical coherence, in intelligibility, and scientific foundation. Hypothesis for hypothesis, faith for faith, methinks our belief appeals more to common sense.

Materialism loses itself in contradictions, and shows itself inadequate even in its explanation of the material creation. On this subject Dr. Maximilian Klein, curiously enough an enemy to Christianity, writes: "The materialism so widespread among students of nature is a sign of the want of logical training unfortunately only too common among men of science. Logically trained minds must take exception to the extremely vague conception of "force," and the exceedingly obscure coupling of it with matter; they must also object to the confused derivation of spiritual life from matter. The soul-processes are confusedly given out, for example by L. Büchner, now as bodily movements, now as the effects of motion. Think, too, of the careless oversight of the principal difference between bodily and mental facts in the well-known utterance of Carl Vogt, that "the thoughts are secreted by the brain in the same way as the urine is by the kidneys." "The first-mentioned objection is specially applicable to the new variety of materialism known as 'monism,' which is rapidly coming to the fore. The universal substance (or matter) assumed by this doctrine is a metaphysical idea which is completely indescribable because it is beyond comprehension. It is a pure construction, and because of the qualities attributed to it (absolute, infinite, without prop-

erties), contradictory, vague, and irrational. In short, materialism in all its forms is, in my opinion, a system absolutely metaphysical and dogmatic."

* * *

We see how little able the materialist is to explain even the forms and phenomena of matter; the inadequacy of the system, however, becomes still more apparent when we bring it face to face with the life of the world and the human race, the phenomena of history, and the ideas and spiritual forces which agitate the world.

The materialist does not even try to explain the spirit; he contents himself with denying its existence. For how should eternal matter have created a spirit which looks at it critically, tests it and examines it, and then contemptuously exclaims, "I am greater than thou!" And with right, for one is superior to what one examines and explains.

Love, faith, hope, duty and morality, conscience and remorse, the fear of God, and religion are to him curious, inexplicable, worthless products of matter, which show traces of insanity in their constant aspirations after something higher, after God, persistently denying their origin and the source of their life, dead matter. He would fain regard them as chemical products which a more advanced science will be able to produce artificially. This view is indeed taken by a Frenchman; for to the materialist such facts are terribly in the way, and hitherto he has had to content himself with declaring the religions of all races from Pole to Pole, during

thousands of years to be the invention of priests to whose interest it has always been to keep the people in a state of ignorance and superstition—a very poor explanation, which is not historically tenable, either! From the North Pole to the South for six thousand years man, whether Indian or Eskimo, Hottentot or Tunguse, has bowed before two great Powers, that of Good and that of Evil, of whose dominion over himself and nature he is dimly conscious. Whence comes this feeling, common to all races, of separation from some great Unknown, of banishment from some blessed place never seen, but dimly conceived? “Who dares,” cries Seneca, “to affirm that the gods live without thought of or care for us? Does he not hear all the voices at prayer, does he not see everywhere hands raised imploringly to heaven?” “The soul of man,” says Jacob Boehme, “is ever seeking his fatherland, from which he has wandered, and longs to get home to everlasting rest. His constant question is, Where dwells God with the holy angels? and Where is our dear home where death can not enter? It can not be in this world, or we should have found it long ago.”

Besides the origin of life, the materialist is equally powerless to explain the presence of death, which he looks upon as a material phenomenon, while to us it is a spiritual one. For death, the terrible power which overshadows and darkens the whole of life, is not a natural occurrence, and as such to be explained by science, but something unnatural which has come from without. This is proved by the fear of death observable in the whole creation, the fear of the animal and the infusorian, the constant dread of man. If death is

merely the natural resolution of the body into its component atoms, what does it matter to my atoms if they are to form new combinations, and of what nature these are? Why should chemical substances have such a horror of forming other substances? Nay, if, to use the favorite expression, death is but "the goal of our life fixed by nature," it ought rather to be approached like every other goal, with a feeling of satisfaction.

But that is not the case, and even death from extreme old age, the kind of death which we call "natural," is anything but natural. It would never enter a child's head to inquire, Why is so-and-so still alive? but it would at once ask, Why did he die? Yung writes of the natives of Australia on the Lower Murray: "The Marrinjeri regard death as something unnatural. They believe that life would last undisturbed unless put an end to by some fatality or by disease produced by magic." The Medical Faculty of Paris in 1572 discussed the thesis, "Is the necessity of death innate in man?" Schwann, the founder of the cellular theory, says frankly, "I really do not know why we die!"

The common comparison of the human body in old age to a wornout machine is quite erroneous. The body is not a lifeless machine, animated from without by steam or water-power; but is, like the acorn and the egg, an organism which bears within itself the powers by which it is continually renewed. It is not to be explained why the child, after becoming full-grown through the assimilation of food, all at once ceases to grow, though the man eats and digests as before. It is still more inexplicable how after a few years he begins to decrease, becomes, in fact, smaller, and dies; how

the vital forces in him become paralyzed, for nowhere else have we in nature an instance of the paralysis of a force. To talk of bones and sinews becoming hard and brittle is no explanation, because the bones and sinews of an old man are not the same that he possessed in his youth. It is a well-known fact that the human body renews itself not every seven years, but still more quickly, on an average every three years, the renewal of substance taking place in some people and in some parts of the body more quickly than in others. Accordingly the old man of seventy-five has no longer the same body that he had at seventy. Why, then, can not the same vital force produce from the same substances, and often under much more favorable conditions, such as more abundant and better nourishment, more rest and care, the same body as it did in youth? Why does it ultimately refuse altogether to go on building up the body in spite of sufficient food and drink, so that man is at last compelled to die, professedly of old age, as if force or matter, phosphates or carbon hydrates, could become old! If the separate parts of a locomotive were carefully replaced by others as soon as they showed traces of wear, no one would expect the machinery to go on doing less and less, and finally stop altogether—*because the steam-power was paralyzed!*

Continual life, the constant growth of an organism which in its origin possesses the powers necessary to growth, is the only thing which is “natural,” given a sufficient supply of material. The Bible tells us so, too. The God of Life made all his creatures for everlasting life. But by one man’s sin death came into the world; it is the wages of sin. And in answer to the postulate

of our spirit, which feels that we were made for life, and not for death, we have the promise, "There shall be no more death." (Revelation xxi.) Of Abraham, who died "in a good old age," it says he died "full of years," having filled up the measure of life. Therefore because the soul which has been sent by God into the world has, as Jacob Boehme says, "proved to the full the mystery of creation, and found that it is only the mirror of the Eternal, it breaks the mirror, desiring to return to the Eternal whence it came;" therefore we die. Or as Culman says, "When the gift has been assimilated, the assimilation of the Giver must immediately follow!" This world is the gift of God, and of the devil also. When man has tasted to the full its joys and sorrows, its ideas and powers, it becomes insipid to him, and he stands in need of a higher power either of good or evil; he longs for either heaven or hell, for God or for the devil; and he dies, not because his bones have become hard and brittle, but because the spirit in him no longer takes the trouble to go on building up for itself a body, a material appearance; because his soul is weary of earthly food, though all unconscious of it. This is the reason from a subjective and human standpoint. Regarded from the objective and divine, we die because by constant sin we have separated ourselves more and more from God, the Source of all life, like a branch gradually severed from the trunk which supplies the sap.

We have in the death of Christ on the cross and the suicide of Judas a type of the death of the Christian and of the godless man. The ideal death of the Christian is martyrdom; that is, the yielding up of his God-given life for the sake of God and for love of the God who

himself died a martyr's death on earth. The fitting end of the atheist is suicide, the voluntary plunge into supposed annihilation, in reality, alas! into the iron arms of Satan. Hartmann, the materialist and philosopher, has with commendable candor set forth suicide as the ultimate consequence of materialism; the speedy suicide of humanity and of creation in general, a universal cessation of the desire or will to live is the end to be desired! The man is perfectly right from his point of view, and has the support of no less an authority than St. Paul. For he exclaimed on one occasion: "Wretched man that I am! Who shall deliver me from the body of this death?" And at another time he confesses candidly, "If in this life only we have hope, we are of all men most miserable."

It is true that comparatively few, as far as appears, have come to either the one end or the other. But is it not martyrdom when a man spends his whole life in God's service, and wears himself out in that service? And is it not suicide when a man, by indulgence in forbidden pleasures, the lust of the flesh, the lust of the eyes, and the pride of life, consumes his powers in the service of sin, and thus shortens his life? Are not most, perhaps all, men looked at in this light either martyrs or suicides? How terribly true the assertion is that suicide is the normal end of the godless, is shown by the ever-increasing number of suicides which in Europe alone, it is said, annually exceed three hundred thousand; and God alone knows how many are kept secret. At any rate the number in this century far exceeds the total of those killed in war—the suicide of the highest and greatest, the learned and respected, the richest and

apparently happiest. We can hardly take up a newspaper at the present day without reading of the sensational suicide, not only of criminals, desperate fathers of families, of betrayed girls, and boys craving for notoriety, but also of princes and generals, officers and bank directors, men of science, and government officials. We challenge the opponents of Christianity to show us a list a tenth or a hundredth part of the length of "pietists" and "psalm-singers," who during the same period have committed suicide. And if they plead that in the majority of cases mental aberration and temporary insanity was the cause, which we do not wish to deny, we must yet remark on the curious fact that Christians are remarkably exempt from these lamentable mental conditions.

Materialism is still more powerless in face of the second death, the death of the soul—the agonized death, even where there is no special bodily pain, of many an infamous criminal and blasphemer who, plagued by gnawing remorse, tortured by a terrible fear of the future, declared they already felt the pains of hell. This "fearful looking-for of judgment" is an undeniable fact, which is not to be explained away by any theory of eternal matter. The "conquistador" who had the conquered Indians devoured alive by his dog, and when himself mortally wounded replied to the question of his companion-in-arms where he felt the pain, "In my soul," is a proof against materialism. So, too, is the calm and peaceful end of the Christian. He dies—by which we do not mean so much the act itself, as the sometimes protracted dying from the moment when it becomes clear to him that his time has come—at peace

with his fellow-men, with himself, reconciled to God and the world, a fruit fully ripe; and often there shines in his face a reflection of an unearthly light, and often his lips utter a truth which is not of this world. There must be some real reason for this!

Besides failing to explain the origin of life and the occurrence of death, materialism fails to do justice to the simplest material manifestations of life. How can, for example, such minute quantitative and qualitative, physical and chemical differences as exist between the brains of great men and men of a low order of intellect account for the immense difference of their achievements? Peter the Great, who by means of his tremendous will-power forged an empire out of barbarous and resisting elements, or Bismarck who compelled forty million Germans to carry out his plans, are historically for that reason a million times greater than many a butcher or agricultural laborer who nevertheless possesses about the same quantity of brain-matter. Wherein lies the cause of the difference? Quantitatively it ought to be a matter of hundreds of pounds of brain-substance; qualitatively the finest cell-organization imaginable would by no means afford an explanation. Or, looking at the question from another point of view: In a certain provincial town there dies an old bachelor. Not only the world, but his native town, his own little circle, undisturbed by the event, pursue their calm existence. But an Alexander the Great dies, and the world is unhinged. And yet in a materialistic sense we have in both cases the same occurrence, the disaggregation of twelve hundred grams of brain-matter, and eighty pounds of flesh and bone which now go to form inor-

ganic instead of organic combinations. If that is the kernel of the matter, why all the commotion over the death of Alexander?

If existence is, as a well-known materialist maintains as sum total of his experience, the greatest of all ills, then Genghis Khan who erected pyramids of seventy thousand men, Torquemada who boasted of having burnt eight thousand men, still better the Chinese general who during the Taeping rebellion had one thousand prisoners beheaded daily for three months, were greater benefactors to mankind than St. Elizabeth or Miss Nightingale or Kate Marsden, the nurse of the lepers in Siberia, who from humanity and by well-organized nursing have kept thousands of sufferers longer in this useless state of existence! In that case the mother who nurses a poor crippled, perhaps idiot, child for years to the detriment of her own health, is positively punishable; for on the one hand she is prolonging to no purpose a painful existence, and on the other depriving the community of so much useful energy!

The materialist view of life, then, brings us face to face with a world, with an existence as full of riddles as ever were invented by the deepest Christian mystic.

* * *

Materialism is unlovely in its relation to nature, among other things. There is in it an utter lack of heartiness and sympathy. It could scarcely be otherwise; for nature is to the materialist nothing but the often aimless, sometimes aggravating and harmful, result of blind forces. He can not free himself from the

position to which logic forces the premises of materialism. How should he feel attracted by it? His doctrines do not even admit of any great self-esteem. What a gulf there is between Schleiden's definition of man as "the animal capable of consciousness of himself as an intellectual being" (*Das Meer*, page 602), and the Bible, which proclaims to us, "Ye are gods, ye are the sons of God, ye are made in the image of Jehovah!" Entirely in keeping with his views is the little feeling which the materialist has for womanhood and childhood. We do not mean to say that he can not be a good husband and father, for a man is never so good or so bad as his theories; but when a well-known exponent of the doctrines designates woman as "the mother-animal of the human species," and another marvels how a mother can be beside herself with joy at the squeaking of a few pounds of flesh, we can not credit them with any great comprehension of the woman-soul or any feeling for the beautiful as exemplified in child-life.

The materialist experiences no desire to glorify nature or to improve it; it is interesting, but at the same time sad, to see how by cutting himself adrift from God he gets farther and farther from nature, and at first unconsciously, but gradually with consciousness, endeavors to substitute for it ingenious and artificial devices. A few years ago at a Science Congress the artificial fabrication of food-products was recommended as a desirable object of endeavor; and the hope was expressed on the same occasion that man would in the course of centuries succeed in acquiring a sixth finger, aspirations which would fail to satisfy an Eskimo or a Tunguse. For what the savage desires is not an increased number

of fingers and so many tons of chemical provisions, but freedom from care, from the guilt which oppresses him, and from the crushing consciousness that he is mortal.

In recent times Professor Berthelot, of Paris, has publicly declared how happy man will one day be, when, agriculture and gardening done away with forever, instead of feeding on meat, vegetables, and fruit, he will only have to carry a little box filled with albumen phosphates and other means of sustenance, which will be prepared very cheaply by means of electricity! It is not quite clear from his speech whether he is in earnest or not; but in any case he only expresses the acknowledged aim of many materialistic chemists and naturalists, especially in America. The gifts of God which he makes to grow in abundance night and day, corn and oil and wine, wholesome vegetables and delicious fruits, are to be flung at his feet; instead of fruit-trees which, once planted, refresh us for fifty or a hundred years with their fruits, and grass for the cattle which, too, grow of themselves, whose milk and flesh serve us for food, we are to see erected everywhere at enormous expense innumerable electro-chemical factories with thousands of costly machines which, being in constant need of repair, make large workshops necessary. And in these provision manufactories thousands of agricultural laborers now turned artisans will be occupied day and night in preparing the millions of tons of food and the hundreds of millions of boxes necessary for the daily consumption, with noise and danger and expense; round about the factories there will probably be mountains of hideous refuse and lakes of evil-smelling liquid. And thousands of others will be employed with the everlasting packing,

addressing, and dispatching, with the receiving and distributing of the boxes. And if any hitch occurs in the machinery or the means of transport, starvation will stare them in the face. Will these dainty pills agree with every digestion, and not in the course of weeks and months cause serious illnesses? And all this in order that man, independent of agriculture, the healthiest form of employment, may wander, idle and bored, box of chemical tabloids in hand, over the earth now overgrown with thorns and thistles, or perhaps over deserts, the air of which, Professor Berthelot tells us, is much more healthy than that of woods or meadows. (!) No more joyous feasts and banquets, no daily family meals! Every one puts his fingers into his penny box, and does not know how to kill time. For it has been proved that as soon as the sting of necessity is withdrawn man stagnates bodily and mentally; as we see in the case of the Fijians and Tahitians, and in the Romans when they were provided with bread and games, had their *panem et circenses* at the expense of the State. "Where as in New Guinea," says Wallace, "eighteen hundred cakes of one-third pound can be obtained from a sago-tree with ten days' labor, so that the annual cost of living amounts to twelve shillings a head, man lives in misery; for the less work nature demands of him, the more he hates it." In an Egyptian tomb there is this inscription over a harvest-scene, "When man cultivates the earth, he remains full of gentleness." Ancient wisdom, modern madness!

The poor and miserable aspirations of materialism, and the picture of the future which it draws and would fain realize, show its views in a very unfavorable light;

for one knows a man by his desires. Ask any one what he most wishes, what he would do if he inherited a million to-morrow, and the answer will show you the man as he is. Once there stood in the wilderness of Sinai an old man whom Jehovah assured of his favor. He might have asked empire, or the power to exterminate his enemies—gold and silver were of no account to him—or he might have desired to live ten thousand years that he might behold in proud security the rise and fall of men and nations. He, however, besought, “Lord, that I might see thy face!”

The estrangement of the materialist from nature goes so far that he complains that there is no such thing as purpose in the order of nature. But the fact of its continued existence is a proof that the course of the world is systematically and suitably ordered; if it were not so, it would have fallen to pieces in its first hour. The most trifling alteration would endanger the existence of us all. The slightest increase in the quantity of carbonic-acid in the air, or sea-water in the place of fresh water, or one hundred degrees difference in the temperature, and we should be no more, and half, perhaps the whole, of the earth dead. A letter omitted from the chemical formula, one figure taken from the infinite series, and the world-equation would no longer be correct. If there were no carefully calculated plan underlying the world, the air would not be suitable for breathing nor the lungs for the air; the plants could not be eaten by animals, and animals might have no mouths to eat with. To deny that creation shows a marvelous adaptation to purpose, is to deny that the fish is suited to the water and the bird to the air, the eye to light, the

ear to sound, the hands for grasping, and the feet for walking.

Of the suitability and purpose of the world in a higher sense, Schopenhauer says: "At this present period of intellectual weakness pantheists are not ashamed to say that life is its own object. If our existence were the chief end of the world, it would be the most wretched and idiotic object ever set up, whether by ourselves or by another." (*Parerga et Paral.*, §147.) And Flammarion said at the grave of his friend Marpon: "If this grave is the end of existence, and its closing word, Creation is senseless, and the infinite universe with all its suns and moons, with all its creatures, with all its light and hopes, less to the purpose than the most trifling action of the dog or the ant; that action would have an object, while nature in general would have none!" Purpose, however, presupposes a will conscious of its object, and the well-known utterance holds good: That this perfectly-adapted world originated of itself I will not believe until the twenty-six letters of the alphabet, mixed by thousands and well-shaken, arrange themselves of themselves into the *Iliad* or the *Odyssey*.

Still more insensate than the denial of the material purpose of the universe is the denial of its spiritual purpose, the moral order of the world. In contradiction to the experience of all mankind, to every-day and universally known facts, to the inner voice of man, to the fundamental principles of all governments, to the wisdom of all nations and their proverbs, the materialist denies the practical and profitable, the policy, the utility of virtue and right, and the injuriousness and destructiveness, the unprofitableness of evil and wrong. He

can not explain, and his tenets do not permit him to believe, that ill-gotten gains never prosper, honesty is the best policy; that pride goes before a fall; that life is not the greatest good, but sin is the greatest evil; and that all guilt is avenged on earth; in short, "*that righteousness exalts a nation, but sin is the ruin of man,*" the great and constant confirmation and justification by fact and history—that of the individual and of the nation—of the eternal laws of the spirit, the Divine logic in the government of the world which Job and his friends admired, which Solomon affirms in his Proverbs; they are not chemical and physical laws, they are facts which can not be referred to the mechanism of atoms. And therein lies his weakness and his powerlessness, even if he succeeded in explaining all the phenomena of matter and in solving all its riddles.

This blindness to the moral order of the world is the cause of the darkness which surrounds him. In him is fulfilled the word of Solomon, "The righteous eateth to the satisfying of his soul, but the soul of the wicked shall want." While the Christian finds everywhere in God's world logic, justice, goodness, wisdom to the satisfying of his soul, and for the growth of the inner man, to the materialist the world is desolate, barren, and unenjoyable, an objectless, senseless, and perplexing piece of machinery. What is the use of so-called righteousness? And if right and wrong are the same, what is the good of living? So he becomes bitter and pessimistic, and in a greater degree the more he is by nature inclined to nobility of mind. One hears it in their words and writings, and many, if they spoke openly, would probably complain like a classic German

writer of "inward withering." With the same intuitive logic which led the Greek to call out to his opponent, "You are getting angry, therefore you are in the wrong," we cry to the materialist, "Your view of life makes you unhappy, consequently it is not the true one!" The only tolerable form of materialism is that of the corpulent gourmand, who, without caring to inquire what truth is, lives according to the motto recommended to him long ago by St. Paul, Let us eat and drink, for to-morrow we die!

Materialism explains neither science nor art. Not the former, because to a consistent, logical materialism, knowing or not knowing is a matter of indifference. The only reasonable object of a brief life emerging from nothingness to sink again into nothingness can be to experience the greatest possible amount of pleasure with the minimum of pain. If a man takes pleasure in science, there is no objection to his seeking his individual enjoyment in that way; but it is not logical of him to require that I should take my pleasure in the same manner, or concede to science a right or influence over my life. I am quite justified in answering, "I prefer a purely material form of enjoyment." The materialist can offer no explanation of the insatiable thirst for knowledge which is shown in the child's questions: What is that? What do you call it?

Still less can he explain art. To him it is of no more value than the Fijian woman's adornment of herself with shells and coral, and the war-paint of the Indian, an obscure and unconscious impulse of matter to ornament itself simply because it is pleased to do so. It is remarkable that humanity nevertheless sets a high value upon

art. How comes it that men will pay thousands for a painted piece of canvas, for a few trills which are gone almost as soon as heard from a Lucca or a Patti; men, too, who as a rule are reluctant to part from their mammon? Meissonier's sketch of a grenadier is worth 5,000 francs, the photograph of the same, one and sixpence. What is the reason?

We call to witness all the divinely-gifted artists of all times, who with feverish zeal, with ardent enthusiasm, with touching devotion pursued their art at the cost of happiness and honor, of money, nay, in many cases even of their daily bread, and felt themselves blessed by her, that art is something much higher and nobler! A painter is not a man who has learned to prepare a canvas and lay on it cobalt and madder, burnt sienna and Naples yellow, finally picking out the high lights. A musician is not a man who by years of practice has succeeded in performing with ease silvery runs, and in overcoming the greatest technical difficulties as if they were mere child's play. A poet is not a man with an utter disregard of his linen and his clothes, and a lion-like mane, who writes or recites with great skill extraordinary thoughts couched in rhymed and metrical language. But everywhere and always, whether he chisels marble or models terra-cotta, paints in oil or water-color, builds temples or castles, sings, plays the organ or the violin, the artist is a man to whom the material, in itself valueless, is a means of expressing the eternal ideas of beauty dwelling in his soul. An artist is he who sees the spirit behind the substance, the meaning in the form, the soul's mood in the color, the symbol of the Eternal in all the manifestations of the evanescent, and does not

rest till he has made visible to others the beauty and truth of the divine and eternal ideas. And men are grateful to him, and have for thousands of years found in art a source of joy; for those ideas are necessary to their spiritual life, and they feel it.

Passing on to the highest form of art, poetry, we find that it is based entirely on anti-materialistic ideas, and is only possible in connection with such. From Homer to Faust, poets have sung of the eternal and divine ideas of the gods as guiding, illuminating, and punishing powers, of the struggle between the two principles of good and evil, of the final triumph of right and virtue, and of the immortality of the soul; without these ideas no drama is possible—only a puppet-show. These ideas point to a higher and a highest source of beauty which is to be seen in the correlation of all the arts in such a way that the *Nibelungenlied*, for example, may be translated into music and represented in painting. Art is an everlasting protest against materialism, which has never produced, and never could produce, a Michael Angelo, a Dante, or a Bach, those princes of art and of intellect also.

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So far, however, we have not touched the real weakness of materialism. It ignores the three mightiest powers in man and in history: faith, hope, and love—those imponderable forces which animate the soul in a greater degree than gravitation, heat, or electricity affect the body, and without which the life of man would be but a bestial pursuit of food and drink, a rending of one another in the struggle for pleasure and possession.

Materialism leaves love out of the question; it does not know what to make of it; it is described as at most an obscure magnetic attraction between heterogeneous substances, a chemical affinity! The world without love! It would be a den of murderers. We can as easily imagine it without light! What is it which drives millions of men to work early and late in the sweat of their brow at plow and lathe, in mine and quarry, day after day, to provide for wife and child at home? It would be much easier for them to lead a single, loveless existence. How comes it that millions and millions of mothers spend their powers and energies day and night, during long months and years, in feeding, nursing, caring for tiny creatures who are quite helpless and incapable of recompensing them for their trouble; nay, surround weakly and crippled children, from whom no reward nor advantage is to be expected, with a tenfold love! How comes it that these millions of children, without speaking, much less being of any use, make their parents more than happy with their joyous babble, with a smile of love and gratitude, with a caress, requiting thus a hundred-fold all that has been done for them, filling the home with light and love? Are we to believe that these are material and chemical effects? How are we to account for the fact that thousands of noble men and tens of thousands of noble women watch, patient and unwearied, by sick-beds, by the wounded and dying on the battlefield, binding up their wounds and wiping the death-dews from their brows? And how is it that this, from the materialist's standpoint, objectless waste of force and energy, touches men's hearts and wins the esteem of even the roughest? Or how comes it that

every year thousands of brides swear at the altar vows of love and fidelity to the husband of their choice, and joyfully undertake with all their heart to find from henceforth their happiness in making him happy? What has love not accomplished so long as there have been men on earth? It has founded and destroyed cities and kingdoms, carried on war and concluded peace! The materialist has nothing to say; he smiles contemptuously, and evades the question. Naturally, for his god, primal matter, knows nothing of love; one can not suspect iron or hydrogen atoms of such a weakness. In that case, however, he must not pretend to offer us a system which explains the world, or must at least recognize that above the material forces there are higher, spiritual forces which govern it.

Another of these is faith. We saw, in Chapter IV, how it has ever been, and ever will be, powerful to agitate the world. Let us look at it from the materialist's point of view. Speaking of the power of faith, a well-known man of science wittily remarks that it will certainly remove mountains, but has so far never been applied. To our mind he who looks at the history of the world with his eyes open will find that faith removes other things than mountains. What mechanical force was it which, in the Crusades, transported thousands of ships and galleys with heavy instruments of war and enormous quantities of provisions, thousands of mail-clad knights with their horses, and hundreds of thousands of foot-soldiers with their baggage, from Europe to Asia, no small achievement—what was it but faith? *God wills it?* And God did will it; for they accomplished the journey, and conquered Jerusalem, and millions of

new ideas flowed to and fro between West and East, and millions of men were drawn by the Crusades from their rough life, whose only aim was fighting and material enjoyment, to higher and divine ideals, as seen in many of the beautiful hymns of the Crusaders.

What was it which, in the year 1492, drove three ships, with crew and equipment, over the waters of the unexplored Atlantic towards an unknown goal? What but the faith of the man who watched long and anxiously to see emerge from the sea the land which, in spite of all the men of science, he *believed* lay there? And did not this faith of his create a New World, by being the cause of the great deeds, the travels and events connected with, and resulting from, the discovery? The faith in his star, his destiny, his divine mission, or his own power, enabled Alexander and Cæsar, Attila and Napoleon, to destroy and found empires, to change the face of the earth, and, looking at the matter from a materialistic standpoint, to effect mechanical achievements and transportations of matter such as all the steam-engines of the present day could not accomplish without its aid.

What was the force which brought about the Reformation, with all its material, political, historical, moral, and spiritual consequences and results? What broke the papal power, and kept the armies of Sweden, Germany, and Austria embroiled in the 'Thirty Years' War? Was it not by God's will, the faith of one man, who, at Worms, exclaimed: "Here I stand; I can not do otherwise; God help me!" If Luther's faith had faltered, if on that day he had played the coward and hidden himself, the course of history would have been altered.

This faith, which the unbeliever who does not possess it regards as a vain and impotent imagination, has repeatedly in history shown itself to be a powerful mechanical factor. This can only be denied by those who are not capable of reasoning in a sufficiently logical manner to be able to recognize the imponderable spiritualities as the true spring of even the mechanical actions of men. Does not language everywhere speak of the *power* of the will, rightly recognizing that we have here to do with an actual power which does not depend on the bulk and size of the body, nor on the consumption of oxygen by the lungs, and yet is able to effect important exertions of nerve and muscle?

Besides, as we have already pointed out, the materialist, though he does not acknowledge it, himself makes great use of faith. He *believes* a multitude of more or less incredible things, and requires of others the same belief. Declarations such as the following: "The immaterial can not possibly react on the material" (Spiller); "Thought is a movement of matter" (Moleschott); "The soul is the brain at work, and nothing more" (Broussais),—are articles of belief—for nobody can prove them true—and are believed implicitly by those with whose views and leanings they accord.

Of hope, on the other hand, the materialist knows nothing at all; the word is not to be found in his dictionary. Never has any system, any philosophy or theology, so terribly realized Dante's words, "*Lasciate ogni speranza voi ch'entrate!*" "Abandon hope, all ye who enter here!" There is no place for hope in the materialist's creed. St. Paul writes to the Ephesians, "Remember that ye were without Christ, having no hope, and

without God in the world." I may be rich and honored; I may be a man of great learning, and proudly conscious of the fact; but in spite of that, misfortune may at any moment overtake me. My banker may abscond with my money, my wife may die of syncope, or my child of diphtheria; or my doctor may tell me with a grave face, "My dear sir, you are suffering from cancer; I can do nothing for you!" Thus, almost in an instant, my whole future is darkened; anxiety, suffering, misery, and finally death, are before me. What comfort will it be to me, then, to think of my labors in the field of science, of the admiration of posterity, etc.? Everything looks black to my soul! Years ago I was on a visit to a friend, a country gentleman, when I happened to speak of paradise. He smiled, and pointing out of the window over his extensive estate, cried, "There is my paradise!" And certainly it was a paradise; vineyards and meadows, framed by fruit-trees, lay in the sunshine sloping down to the blue lake, and above them the snowy Alpine peaks rose into the blue sky! A few years afterwards I returned to the place; the lake still lay smiling in the sunshine; the trees were laden with blossoms; but the owner of it all sat in his room a broken-hearted man, the picture of misery. His son had been drowned in the lake before his eyes; a daughter had made an unhappy marriage, and he himself was slowly dying of an incurable disease. And when his younger daughter came into his room and said, "Father, I am going to drive into town; what shall I bring you?" he answered, gloomily, "A pistol!"

The men who would extinguish the sun of love and the morning and evening stars of faith and hope, leaving

mankind only the night of annihilation to look forward to,—these are the men who call themselves enlightened, the champions of light! And they call us who believe in a God of love and hope for an everlasting life, where we shall shine like the sun, enemies of light and obscurists.

But they know or feel why they treat love so slightly: Love indicates goodness, is produced by it, and attracted by it, and presupposes good, as hatred, the offspring of evil, does wickedness; and, rightly deduced, love leads us to a God of goodness, and hatred to a god of evil. We can not escape from good and evil. As our material life is unalterably bound up with day and night, so is our spiritual life with good and evil. This is recognized by the Emperor of China, who places over all his officials and mandarins two chief ministers, who alone have access to him at all times—the one the “counselor of good,” whose duty it is to report good deeds, and propose rewards; and the other the “counselor of evil,” who reports evil, and demands punishment. Whence arises this division of the world into two halves, a fact of which materialism offers no explanation?

For it is impossible to see how the movements of atoms can be morally good or evil. No one has ever succeeded in proving the existence of the moral principle in matter; but if it is not intrinsic, whence is it, and how comes it to exist in the various manifestations of matter? Or, to put the main question: How comes the notion of a God, who rewards good and punishes evil, into the world at all? How came the primal substance, “the infallible and all-wise” universal ether, to create a God who affirms this primal substance to be

his creation? For whether there is a God or not, the belief in him undeniably exists, and dominates the history of the world. If all is only the product of the all-just and all-wise ether, then this belief in God is also just and wise. Herewith the cause of strife is removed, and there is an end to all hostilities!

Conscious of his weakness on this point, the materialist is pleased to represent morality—by a one-sided interpretation of historical and anthropological facts—as the gradual and variable product of custom, climate, manner of life, etc. That it most certainly is not. Four thousand years ago the same ideas of morality prevailed among Indians, Chaldees, and Egyptians as among ourselves at the present day. This is clearly seen from their legal and religious books. Only their conception of it was larger-hearted, to judge from the Egyptian prohibition, “Do not insult the deaf; do not abuse the slave to his master;” and the legal dictum, “He who sees a crime committed, without preventing it to the best of his power, is guilty of the crime.” That is a beautiful Greek idea, “The unfortunate are sacred.” “The stranger and the poor belong to Zeus,” says Eumœos. And how grand, how far above the morality of the present day is that of Job! On all the epitaphs of antiquity the dead man is praised for having practiced virtue and justice, spoken the truth, done good, and eschewed evil. As there has at no time been a nation of atheists, so there has never been a nation which did not honor virtue and despise vice, however vicious it might be. The most immoral of peoples have revered purity; those most given to falsehood and cunning have honored truth; the most

cruel have highly esteemed gentleness and mercy. At no time, even among the most savage and degraded races, however coarse and brutal the individual, however base the people in general, has ingratitude been extolled, contempt of the gods or of parents, or insubordination been tolerated. Never has maternal love, wifely fidelity, or manly courage been lightly esteemed, or cowardice, perjury, and hypocrisy honored. Socrates asked Eutyphron, "What! hast thou ever heard of a man who doubted that he who had unjustly killed another, or done any other act of unrighteousness, must suffer punishment?" At no time has self-interest been considered a sufficient excuse for the infringement of the moral law. "May the memory of him perish," cries the Greek sage, "who first dared to make a distinction between what is just and what is profitable!"

It has been left for our "enlightened" age to found a morality upon the varying subjective principle of utility and advantage. Do not kill your neighbor, that you may not be killed by others. Do not steal, lest others steal from you. What a wretched thing is police-regulation morality, especially compared with the grand principles of Christianity, "Love your enemies; bless them that curse you; do good to them that hate you, and pray for them that despitefully use you and persecute you, that ye may be the children of your Father which is in heaven; for he maketh his sun to rise on the evil and on the good, and sendeth rain on the just and on the unjust."

All the virtues, says the materialist, are the outcome of egoism. In that case it must have been a primal egoism, like the primal substance, the primal

germ, the primal cell and primal man, very different from the present; for that egoism is nowadays the parent of no virtues, is pretty generally acknowledged. Besides, egoism is as difficult of materialistic explanation as love itself. Nothing is, in itself, either good or bad, he says further. Then practice decides it, the end justifies the means. To be logically consistent, we must do a little evil if much good is to come of it. A miser is lying ill. This man, a plague to those around him, whom he starves, possesses an immense fortune, which, at his death, will fall to his wife, who would use it for the relief of hundreds of poor people, and to his children, who are sadly in need of education. Let the doctor resolve him into his chemical constituents by a strong dose of morphia. Why not? In this case the welfare of the many is of more consequence than the will of the individual; and this individual will, at the same time, be released from all misery.

What of remorse? How comes the brain, a Christian physician asks, to inflict on itself moral chastisement by the vibration of its atoms, and to secrete remorse as the liver secretes bile? Suppose that, years ago, I, a man absolutely penniless, had met an elderly tourist in a lonely mountain pass; he lamented that he was alone in the world and weary of life; then carelessly let me see a pocket-book full of banknotes, and turned to look over the precipice. I took the pocketbook from him, and gave him a push. In another second his body lay, a lifeless mass, at the foot of the rock. No one saw the deed, and no inquiries were ever made. The money laid the foundation of my fortune, and I am now a man of position. What is the reason that, since that

time, I have not been able to sleep; that I would give the world full of gold to see him standing there alive? The materialist tells us the destruction of the weaker by the stronger is the fundamental law of evolution. What is useful and advantageous is good; what is useless is bad. But who is to decide what is useful and what is not? He whom it concerns, of course; for only he can know. We see that this principle leads to consequences anything but desirable; for what is very advantageous to my neighbor may be harmful to me. How powerless utilitarianism is as a governing principle we see daily in the case of thousands who bring ruin upon their families by drunkenness and vice, although they are perfectly well aware that the life they are leading is in no wise profitable. The self-interest of the Roman and the American planter in the health and well-being of their slaves never sufficed to restrain them from ill-treatment of them, and even murder. What did Nero and Ivan the Terrible, to whom the torture of their fellow-men gave exquisite pleasure, care for utility?

The Christian conception of morality, which holds that there is an absolute good and an absolute evil, in accordance with which the world will be judged, is much more utilitarian than utilitarianism itself, which, after all, can only be recognized in an imperfect and one-sided manner; for every one must admit that, so long as the world has lasted, this principle has done more good and prevented more evil, is, therefore, more useful and profitable than any materialism.

His indignation when his doctrines are stigmatized as immoral, and his endeavors to give it a moral signifi-

cance, show how little able the materialist is to liberate himself from the categorical imperative of morality, from the inward command, "Do good, and eschew evil." If he wishes to be consistent, he ought to reply to the charge of immorality, "There is no such thing as morality or immorality, only utilitarianism." We can agree to the proposition that "what is useful is good, and what is unprofitable is evil," if they will allow that the fear of God is profitable, and sin what is unprofitable. "Sin is a reproach to any people," says the Scripture. And so, too, with the saying, "Philanthropy is true morality." We put before this precept, which is more clearly and sharply formulated in the Bible, thus: "Thou shalt love thy neighbor as thyself," the still higher one, "Thou shalt love the Lord thy God with all thy heart, with all thy soul, with all thy mind, and with all thy strength."

In connection with the morality of his own doctrine, the materialist loves to rail at the God of the Christians, who is so cruel and sends upon men so much sorrow, misery, and trouble, famine and pestilence, earthquake and flood, hurricanes and misfortunes of all kinds by sea and land. After the great theater-fire in Vienna a materialistic paper wrote with rage, "This God, who is continually pouring out misfortune upon his creatures;" and after the terrible fire at the Bazaar in Paris another spoke of him as "the Moloch who burns innocent women." But the next moment they teach us that this God does not exist at all, and that it is their god—the primal substance, alias universal ether, or world-soul—who does everything. Their god, then, is no better than ours; and we are as

much justified in abusing that stupid, blind, deaf, and dumb idiot, the primal substance, who sends so much sorrow, misery, famine and pestilence, earthquakes and floods, upon us. If we must endure chastisement, we would rather have it from a personal God, and for a particular purpose, than from a something which hits out blindly, knowing neither why nor wherefore. There is one great difference which our opponents forget to take into consideration, and that is that while their god has, from all time, sent sorrow and pain upon his unhappy creatures, and will continue to do so still, luckily for all, he finally congeals; and our God sends for a second of eternity sorrow and pain for our chastisement and our betterment; and He who understands all the desires and longings of the hearts which he created promises "There shall be no more death, neither sorrow nor crying; neither shall there be any more pain; for the former things are passed away. Behold, I make all things new."

* * *

The materialist is very inconsistent in his dislike, or, to speak plainly, his hatred of godliness and religion altogether. Spiller calls those who believe in miracles "the most stupid of all men." (Luther, Goethe, and others, are pregnant examples!) The unknown author of the "Confession of Faith of a Modern Man of Science" asserts that "all the praying under the sun has never done away with one tittle of misery or vice," although thousands of honest men testify to the contrary from their own experience; and the Salvation

Army, whatever one's opinion of it may be, has undoubtedly, by means of prayer, reclaimed hundreds from drunkenness and vice. The celebrated author of "Kraft und Stoff" exclaims: "There are no spirits of any kind. No man has ever been raised from the dead." How does he know? And that they call exact investigation, unprejudiced science! This hatred, this rage against religion, does not say much for the conviction of materialism. It rather bears witness to a feeling of its own weakness and powerlessness. How, in fact, can materialism combat, refute, and stamp out the law of Christ with the laws of nature; the "power from on high" with the forces of nature; the Holy Spirit with discussions of the most learned description; love, faith, and hope by means of the differential and infinitesimal calculus? The materialist himself is aware that his heaviest artillery does not reach to heaven, and every Christian worthy of the name presents to him an invulnerable front. Napoleon I expressed the opinion that "no one can stand against public opinion." The Christian, however, is superior even to public opinion, as every martyr has, by his actions, shown. "He that is in you is greater than he that is in the world," says Christ.

With this prejudice and dislike to all that savors of religion, the materialist stands in sharp contradiction to his system. If all existence is, as already remarked, only the necessary and useful product of a substance—unconscious, it is true, but working with absolute logic—Christianity and all other religions can form no exception; and the materialist ought to look with interest and sympathy upon this world-ruling phenome-

non as one of the greatest achievements of his beloved eternal matter. Hegel's dictum, "Whatever is, is right," is accepted by materialists like Spiller. Then religion, too, is right. If, as Tyndall believes, the germs of all religions, as of all other ideas, were once latent in a fiery cloud, how can we Christians help it that these germs have developed with a vitality so much greater than those of the materialistic theory? Delusions, as he calls them, are, from the consistent materialist's standpoint, absurd. In the realm of matter, he says, there are only forces and natural laws, causes and effects. How comes it that the metaphysical ideas of the immortality of the soul and the resurrection of the body, of an invisible and yet powerful spirit-world, of miracles and miraculous cures, of demoniacal possession and prophecy, are found among the simplest and most elementary races, such as the Tunguses and the Lapps? On their assumption, it can be nothing else than the work of matter and natural laws.

But even if all religions were founded on delusions, the materialist who believes that one day, with the ultimate refrigeration of the universe, all notions, be they delusion or truth, will be resolved into a hydrogen nebula, ought to be at least perfectly indifferent even to a delusion. Hartmann says: "*All belief, even this belief of mine, is of no value.*" But if it is a fact—and history affords examples in plenty—that these supposed delusions have enabled thousands, nay, millions, to live patiently and to die happy, the materialist ought to hail it as a grand opiate and anæsthetic for the ills of life. He ought not to begrudge a sufferer this remedy, which has helped so many to live and die; he ought

to recommend it, and make use of it himself, especially as a materialist has never been known to die in joyful resignation of himself to eternal matter, in triumphant hope of the "entropy" of the universe. Death, he teaches, is the end of everything. Consequently no one will be able to see, in the subsequent combinations of hydrogen, oxygen, etc., into which he will presently be resolved, whether they once formed a materialist or a Christian. According to him, all progress and the light of science is only an unconscious sport of matter, which also will come to an end with our earth. It ought, therefore, to be a matter of perfect indifference what attitude one assumes towards these purely material phenomena. "Let us eat and drink; for to-morrow we die," remains, whatever may be said to the contrary, the only view of life thoroughly consistent with materialism.

If we take the words, "By their fruits ye shall know them," as the test, and apply it to the two principal systems of belief, the theistic and the atheistic, we shall find an overwhelming balance on the side of the former. This fact alone ought to be sufficient to convince those who have neither time nor education enough to estimate their philosophical value, of the truth of the former and the worthlessness and falsity of the latter. Where has anything great, good, true, or beautiful been done or made which was not based ultimately on the belief in God, immortality, future recompense—on the belief, in short, that behind this visible, tangible, material, and transient world there is one higher and eternal, of which the visible is but an image and a symbol?

How have nations become great and happy, mighty

and honored; and how long have they remained so? By placing above material prosperity, above wealth and luxury, above expediency, the ideal possessions, the fear of God, justice, and virtue, the immortality of the soul; and they have remained great only as long as they held to their beliefs. When did they lose in energy and morality? When did they begin to degenerate in intellectual superiority and power, in self-confidence and firmness of character, to sink into avarice and sensuality? As soon as they became materialists. That is an historical, universally-known fact, which no amount of scientific and critical argument can controvert.

Where are the great men of atheism, its patriarchs and prophets and apostles, its heroes and lawgivers? Has it ever produced a man who, like Confucius, Buddha, Mahomet, gained and retained for centuries the allegiance of hundreds of millions of human beings to his doctrines? Can it show a lawgiver like Solon or Lycurgus, not to mention Moses, under whose iron law a race has bent for thirty-five hundred years, or a poet like Homer, Dante, Shakespeare, Milton, Racine, Goethe? Has it one artist like Michael Angelo, that great sculptor, painter, architect, and poet, some of whose sonnets are fervent prayers; like Bach, that earnest Christian and mighty monarch in the realm of music; like Händel or Haydn; or a hero like Luther? How are facts to be reconciled with the favorite assertion of the materialist that religion has a stultifying effect?

Materialism is at variance with the whole universe, with the facts outside us, and with the soul and its

voice within us. Man sees how matter and all existing things rush hither and thither in ceaseless course and flow, ever hastening, ever striving in the great race through the ages of time and the abysses of space towards an unknown fixed and eternal goal, where all desires and yearnings will be satisfied; and he sees himself, too, driven by mysterious powers, thirsting after light and truth, after power and freedom and life, sweeping like a storm-wind over the earth, emerging from one dark abyss to disappear, after a few years, into another; and he feels, deep down in his heart, where lie the springs of life, that this running and hastening has a goal and a purpose, is not senseless and useless. Surveying human history, we see how life has, in all ages, sprung from the ideas of the beautiful, the true, and the good, and how all races of mankind have derived these ideas from the existence of a personal God. We see further how all that is great, noble, and lasting in the world comes from men who believed in God and acted on the idea of God, even though they were by no means Christians. All the conquerors and generals, statesmen and lawgivers, poets and artists, sages and scientists, on whose intellectual capital man has for four thousand years been drawing, in whose beams he has basked, believed in a God! And these men, we are told, and the men of God, whose names are graven as with a diamond in the history of the world, the patriarchs, prophets, and apostles, Abraham, Moses, Elijah, and Christ himself, were simply poor, blind enthusiasts, self-deluded fools! The materialist says there is no God. Then certainly we ask, wherefore religion and morality, justice and order, art and science, idealism, poetry, en-

lightenment, and progress? Let us eat and drink; for to-morrow we die!

If, however, you are suffering from cancer, so that you can neither eat nor drink, or if you have suffered so severely that all joy is dead within you, or if you are living broken-down and infirm, with one foot in the grave, I know not what to say. You have heard it from men of learning on scientific grounds, there is no God. Despair, then, and die! What does eternal matter care about your weal or woe? It is not even conscious of our existence. Despair and die! For the gloomy gospel of a so-called enlightenment runs thus: Woe unto them who have not tasted happiness here; for there is no other life. Woe unto those who suffer injustice here; for neither hereafter shall justice be done them. Woe unto those that weep; for they shall not be comforted. We come from nothing, we and all our doings are nothing, and to the eternal nothing we shall shortly return.

On the other hand, faith in God sheds light over the whole creation, over all life. *"In the beginning God created the heaven and the earth."* If we have been standing, incredulous and unsatisfied, face to face with the assertion that consciousness is generated by the unconscious, utility by the purposeless, spirit by matter, life by death, then our heart burns within us, and our spirit rejoices, feeling it has found the truth when we hear the good tidings that these temporal things are the outcome of things eternal, the transient and incomplete had its origin from an everlasting Being; that the drop of earthly life has trickled down from a shoreless and fathomless sea of life; that our feeble light shines to us from an eternal sun; and that the mite of joy and happiness for

which our heart yearns is the faint glimmer of an everlasting bliss which shall one day satisfy our soul. In such a belief there is sense and harmony and true reason. Light, we see, is stronger than darkness, yes than no, love than hate, life than death. This belief is in harmony with the universe, with the sight of the suns in the starry vault, and the flower by the wayside, with the song of the lark and the wood-bird, with all that we call life upon the earth! We know now why and whence there is in all created things that mighty longing for the infinite, that aspiration after something higher and deeper, that joy in light and action which we call life. Every creature yearns towards its source. And by this intense longing after light and fullness of life we may recognize that we have sprung from a living God in everlasting light, and not from dead and gloomy matter; for in that case it would be death, and not life, that we should long for.

He, however, who has seen, or, better still, himself experienced how a Christian, perhaps dying of an incurable disease, tortured with pain day and night, with cares pressing heavily, the present scarcely endurable, the future to human eyes so dark and hopeless, human help so powerless, can yet rejoice in the sure and certain hope, "I shall see God face to face, and live with him in eternal bliss," will not any longer be impressed by the scientific discourse of the materialist. He sees with his eyes; he has tangible proof; he feels in his heart that here powerful forces of the unseen world are at work, before which poverty, disgrace, care, and pain vanish like mist before the sun; and he can afford to smile at the assertion that these are but illusions.

We here take leave of materialism, more disappointed and saddened than indignant; for we remember the time when we approached it full of the expectation of finding it a temple—of Baal, it is true, but still a temple. We expected to enter an imposing hall, supported by fixed and firm principles, as by giant columns, overhead a spacious vaulting of firmly-ordered systems, into which, by large and many-colored windows, streamed the light of science, to pass onward to the choir, where, assembled round the altar of science, venerable priests, in white garments, intoned, in polyphonal choir, a hymn in honor of their goddess.

How different was the reality! We found ourselves in a tumult of contentious disputants, each of whom strove to outcry the others, and thought we had stumbled upon a fair or a country wake, where, from every booth, there resounded a different cry. Here the wonderful primordial cell, which evolved everything from itself; here the unknowing, but all-wise ether; here genuine life-germs, direct from space, guaranteed ten million years old; here the plastidule or thinking atom, the latest novelty! And upon an eminence stood a stately building, fast closed, with the hieroglyphic inscription, "The Seven World-problems, or the Great Ignorabimus!"

And this conception of nature, which talks only of matter and force, which would refer everything to them, and yet is obliged to confess that it knows not what either the one or the other really is; this wisdom, which has no sympathy and no answer for all the longings and questionings of the human heart, which calls the best thing in life a delusion, and the deepest a snare, and

for which suicide is the aim and end of creation—this philosophy, which knows neither faith, hope, nor love, for which there is nothing absolutely true or beautiful or good, which would deny away the soul in my body and the heart in my breast—this uncertain, hypothetical, and arbitrary system, which has no explanation to offer of God or the world, spirit or matter, life or death, art or science, guilt or justice, morality, conscience, or religion, *such claims to be a scientific system!*

Recently some have maintained that it has been overcome by science. But such is not the case. Though natural science is beginning to find out that the materialism of men like Moleschott, Vogt, Haeckel, and Büchner leads it into a blind alley, it has not yet entered upon the right way. Its vague and arbitrary, dualistic and pantheistic, atheistic or theistic notions of the All, of spirit and matter, idea and substance, essence and manifestation, energy, vitalism, conscious and unconscious mind, or the dualism which always runs to monism, attributing to the most minute particles of brain-matter the qualities of the soul as “companion-phenomena,” and, according to the old saying of Humphrey Davy, “making the brain a house which inhabits itself,”—that is no better than the universal ether of Spiller, who has a large measure of scorn for the materialism of others. As long as any system fails to rise to the clear position of a living personal God as Center and Sun of the universe, as Source of all life and consciousness, it remains at bottom, and, as concerns its weight in the world, materialistic and opposed to religion.

Of what avail is the merely theoretical and nominal

overthrow of materialism in science when we can not help seeing how it is actually spreading in the life and practice of the present?

What do modern novels and plays and art proclaim? What do thousands of scientists, authors, poets, orators, write, teach, and preach? What does one breathe in the street and in society but this enlightenment, which is taken for granted in all educated persons, and to which the thoughtless crowd conforms, and which is nothing but the dominion of matter over spirit, or even the flat denial of the latter, and the setting up of enjoyment, as the highest aim of existence? And yet because man is made up of body and soul, and his life consists of the material and the spiritual, a thoroughly convinced and consistent materialist is scarcely to be found, perhaps does not exist. Let a man be ever so deeply absorbed in matter, he has nevertheless moments in which he can not deny his soul.

For this reason materialism will never become a world-power. The world has never been materialistic. A hundred million Negroes and Arabs in Africa, eight hundred and fifty millions of Asiatics, constituting more than the half of mankind, are not materialists. The tiller of the ground is never a materialist, nor the fisherman and the sailor. Fifty millions of Russian moujiks and three million Australians, Eskimos, and Tunguses, Kaffirs and Indians, are none of them materialists. The savage, the child of Nature, never is so. They all believe in God and in the devil, in a future life, in prayer, and in the spirit-world. All of them, however ignorant and degraded they may be, would prefer to do good and eschew evil, fear future punishment, and hope for

future bliss; for they live naturally amid nature, and feel the breath of the invisible Creator, and see his foot-prints. And as no child is a materialist, neither is the aged man. Cicero tells us that before death, even the infidel becomes a believer. Only where men, artificially pressed together like the cells of the honeycomb, lose their original form, the soul is blinded, and falls into artificial ways of thinking. If they were transplanted from the city to the desert, to the mountain, or the ocean, these men would cease to be materialists.

Materialism was never the normal faith of the normal man, and never will be so; for it ignores the great questions which agitate humanity. It takes from man all that makes life worth living, and robs death of its sting, and gives in its stead hypotheses built on air and mist, notwithstanding all assurances that they are founded on well-tried facts. It has always made its appearance in times of spiritual corruption as the product of decay and disease. As soon as the world—that is to say the nation which, for the time being, occupied the foremost place—left the way in which God commanded it to walk, and, instead of living in sympathy with Nature, became absorbed in the one-sided and exaggerated pursuit of one idea—such as in the case of the Greeks, the worship of beauty apart from goodness; as the Phœnicians and Carthaginians in commerce; Rome in the conquest of the world, accomplished by right or might—this one-sidedness took its revenge. An obstruction of the life-giving sap set in, with high fever, and at its height a crass materialism made its appearance, periodically accompanied by depravity of morals, falsehood and hypocrisy, bribery and corruption—a state of things of

which we have a faint foreshadowing in France and America at the present day.

The Romans, sated with conquest, sunk in voluptuousness, burst, we are told, into loud applause when an actor exclaimed: "After death, nothing! Death itself, nothing!" But the provinces by whose corn and by whose labor they were nourished still venerated the gods; and when they became contaminated, and lost their faith, the empire fell to pieces under the stroke of the Barbarian. The Vandal king, Genseric, asked by his helmsman, "Whither?" replied, "Take me to the peoples with whom God is wroth!" It was the same story before the outbreak of the French Revolution. A few thousand Parisians—court and nobility—spent their lives in gay and careless mockery of God and the world, while the millions dragged out a wretched existence, made up of labor and tears. Then the storm broke. The Revolutionists, it is true, cast aside God and religion as part of the old rotten order; but after a time they reinstated him, having found out that without him the world would not go round. Chateaubriand wrote his "*Génie du Christianisme*," and Lamartine his "*Harmonies*." "The mills of God grind slowly, but they grind exceeding small!"

Materialism will never become a power in the world. It is not made of the right stuff. Men do not live and die for the primal germ or the thinking atom. There is altogether too much negation and too little affirmation about it; and negation never leads to strength. For the deep thinker it is too shallow; for the masses estranged from God; for the anarchist of the future it is too tame and languid. When they have sufficiently criticised and

despised the gift—Creation—it becomes, in time, a necessity to attack the Giver; for to intrench one's self behind primordial cell and atom is a mild and invertebrate form of godlessness. The fools say in their heart, "There is no God;" but Satan cries to God, "Touch them, and they will curse thee to thy face." (Job i.) And the world ripens to that falling off from God, of which it is written in Psalm ii: "The kings of the earth set themselves, and the rulers take counsel together against the Lord and against his anointed, saying, Let us break their bands asunder, and cast away their cords from us." And a hatred of God will be developed, such as is only possible through the consciousness that there is a God; for where there is nothing, it is unreasonable and impossible to hate. This hatred is already to be seen in flashes on the horizon, as the following quotation from a socialist paper, the *Volksstaat*, makes terribly evident: "We will rather serve the prince of the underworld than the Lord of heaven; and if revolution is an 'emanation of Satan,' then shall Satan be our god. Revolution is certainly Satanic in its nature, if Satan be the symbol of the spirit of rebellion, the enemy of all gods, priests, kings, of all the representatives of authority, and the whole machinery of law and government." The following, too, from an anarchist organ, will come as a shock to those who live sheltered from contact with the non-Christian world: "God and Christ are to blame that the people still languish in bondage. We look upon God as the greatest evil in the world; and therefore we declare war against God. War against God and Christ! War against all despots in heaven and earth!"

But the prophet and psalmist says, "He that sitteth

in the heavens shall laugh; the Lord shall have them in derision." (Ps. ii, 4.) Let us do likewise with all infidelity, trusting in the strength of our God; for with all its presumption and arrogance it is but a poor wight, which, on closer scrutiny, fills us with pity, not fear. Look it fearlessly in the face. You will soon observe its lack of confidence. Instead of fearing his scorn and ridicule, turn the point of the spear, and ask the infidel what *he* knows, what *he* believes, what *he* hopes. Do not be led away by stock phrases as: "Of course, no one nowadays believes such things." "Those ideas are things of the past." "Science has long since done away with those antiquated notions," and various like cheap and untrue sayings. Attack him boldly, and demand a candid exposition of his views and beliefs. You will very soon come to the conclusion that "Unbelief knows nothing." It pulls down, but builds not again; it denies, but does not affirm; it takes, but does not give; it ridicules, but does not prove. It is a negation, which owes its very existence to the truth which it denies. The world and itself remain to it riddles incapable of solution, things whose object it knows not. When a man like Schleiden, who is, in other respects, an idealist, writes, "The universe is a machine, a concourse of atoms, continually in motion; we are at our wits' end when it comes to explaining the essential nature of matter and force mechanically, and referring it to a necessity" (Das Meer, p. 16), it is simply confessing in other words that we do not know whence this machine comes, nor why, how, and wherefore it works. The unbeliever can not say enough in praise of progress, and at the same time teaches that the universe, and all that is therein, will one

day congeal in everlasting darkness. He who shrugs his shoulders at Christian dogmas sets up unprovable dogmas on the non-existence of God, of the eternity of matter and force, and teaches at the same time that they do not exist. He scorns the notion of miracles, yet believes in a world which originated of itself, without knowing why; in an unconscious substance which generated consciousness; in a primordial germ, which created itself. He denies the soul in man, and believes in its existence in the atom and the molecule, teaches the eternity of matter and the non-existence of time as such, the eternal duration of the world and its evolution still in its first stages. It believes in the primal self-origin of life, and denies spontaneous generation in the present; it demands the greatest veneration for science, and disputes the existence of absolute truth; it preaches the logical necessity and utility of the world-process and the absurdity of religion; the perfect justice of eternal matter, without any future system of reward and punishment; a moral order without an abiding principle of righteousness, guilt without God, and expiation without the immortality of the soul. His system is a chaos of contradictions. No wonder, considering that his gods are deaf and dumb, unconscious matter, and blind, foolish chance.

And a chaos of inconsistencies is the life of the man who gives it more or less allegiance. He halts between modern advanced thought and traditional ecclesiastical forms, which he has not the courage to throw overboard; in his heart believes neither in Christ nor in the gospel, and still calls himself an evangelical Christian. He talks, on tombstones, of "a better land," "a

sweet and blessed country," his relatives are "not lost, but gone before," and yet he is horribly afraid of death. He extols "free thought," and yet slavishly truckles to every celebrity and every intellectual fashion of the hour, to social etiquette and public opinion. He lauds simplicity, and loves show; praises contentment, and can never amass sufficient wealth. He talks largely of character and culture, and runs after any novelty or any form of amusement, however foolish, to fill the void in his enlightened soul, which no longer either believes or hopes anything. His life is a perpetual contradiction, a constant lie. Yet there are moments when, in the depths of his being, the poor soul sighs and would fain be a partaker of life everlasting and eternal bliss.

* * *

The Christian's view of life and Nature shows itself, on close and unprejudiced examination, more natural, practical, true, and satisfying than the unchristian and anti-Christian beliefs of a thoughtless and prejudiced multitude. The Christian religion is, at the same time, the truest and most scientific philosophy, because the answers which the Bible supplies to the problems of existence accord most satisfactorily with facts. While among non-Christians, taking mankind from Pole to Pole, hardly one in a thousand concerns himself seriously with the problems of life, and by far the greatest number know no other aim than gain and enjoyment, in our Lord's words, "What shall we eat? or, What shall we drink? or, Wherewithal shall we be clothed?" (for after all these things do the Gentiles seek), every true Chris-

tian is consciously or unconsciously a true philosopher, whose life-task consists, on the one hand, in comparing and bringing those divine answers, day by day, into agreement with the life within and around him, by which truly philosophic study he grows and increases in the inner man; on the other hand, in endeavoring with the same earnestness to bring his every word, thought, and deed into conformity with his beliefs, which proceeding is exactly what Plato requires of a true philosopher. The beholding of eternal truth, by the power of God, enables him to "have a right judgment in all things," and to perform good works; and by a reflex action the fruits of his belief bear in themselves the proof that the premises from which they started are true; for truth alone produces goodness.

The Christian does not believe in opposition to science and in spite of science; but he believes, in consequence of the knowledge, that the science of faith better explains the past and present order of things, and is, for that reason, truer and more scientific than the science of unbelief.

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